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ABSTRACT

To fill a need for defining and describing 15 occupational clusters identified by the U.S. Office of Education for a comprehensive career education program in a Texas county, this federally funded analysis presents separately for each of the 15 clusters a rationale, methodology, subgroupings into job families and occupational listings, and a chart of occupational areas. Developed by 15 consultants, these job classifications will prove helpful for vocational counseling purposes. Job identification numbers from the government publication, "Dictionary of Occupational Titles," are included with the occupational information. (AG)

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AN ANALYSIS OF FIFTEEN OCCUPATIONAL CLUSTERS IDENTIFIED BY THE U.S. OFFICE OF EDUCATION

PREPARED AT GRAYSON COUNTY COLLEGE,
SHERMAN/DENISON, TEXAS UNDER A GRANT FROM
THE TEXAS EDUCATION AGENCY

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INTRODUCTION

Career education is the new main thrust of the U. S. Office of Education, and the idea of revising curricula at all levels in elementary and secondary schools to prepare youngsters better for the world of work is receiving increasing attention. U. S. Commissioner of Education, Dr. Sidney P. Marland is a vigorous supporter of the concept and has spoken and written extensively on the subject. A major reason for emphasizing career education is the following:

Each year in the United States, 850,000 young people drop out of high school and another 750,000 complete high school lacking either marketable job skills or the background for higher education. In addition, 350,000 drop out or fail out of college annually. The figures add up to almost 2.5 million.

Career education starts in the earliest grades incorporating into the regular curriculum information on how people earn their livings. This effort is intensified in occupational orientation courses at the junior high or middle school level and culminates in the high school years with actual experience in the world of work for larger numbers of students.

Grayson County's Coordinated Effort for Career Education (CECE) is one of the first attempts in Texas to combine various components of career education in a single project. Beginning with Occupational Awareness in the elementary school grades K-6, the project will also include occupational investigation in the middle school (7-8), occupational exploration in the high school (9-10), computerized vocational guidance and intensive group guidance at the upper high school and junior college level, and a placement and follow-up office for students, out-of-school youth, and adults.

The county-wide project, which includes thirteen public school districts, one private school, and a public junior college, is administered by Grayson County College.

In the early planning of the CECE project in February-May, 1972, it became apparent that understanding the fifteen occupational clusters identified by the U. S. Office of Education would be vital to any career education program. It was also apparent that there were no materials available

defining the content of the fifteen clusters. In visits to the Texas Education Agency, regional conferences, and out-of-state meetings, I continually inquired about the occupational clusters and their composition. Since satisfactory answers to these inquiries were lacking, a research proposal was submitted to the Department of Occupational Education and Technology of the Texas Education Agency providing for an analysis of the fifteen occupational clusters to determine what broad categories of activities are included in each and what specific occupational titles are encompassed in each activity. The proposal was approved, and during the month of June, 1972, fifteen academicians and practitioners worked at Grayson County College in an effort to delineate the fifteen occupational clusters. This book is the result of their labors.

The Director of the project was Neal A. Baker, an instructor of history at GCC, whose administrative abilities, dedication, and sense of humor greatly facilitated the work of the staff. Dr. Truman Wester, President of GCC, and T. E. Bullard, the college's Vice-President for Administration, took an active role in selecting the project's participants and in generally encouraging the work.

It is hoped that the Analysis of Fifteen Occupational Clusters Identified by the U. S. Office of Education will be useful to superintendents, principals, supervisors, teachers, and counselors in their planning and implementing of new courses and activities in career education. Your comments on and criticisms of this work will be appreciated.

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PREFACE

This study is entitled "Analysis of Fifteen Occupational Clusters Identified by the U. S. Office of Education." It was approved by the Texas Education Agency in May, 1972, and work was begun May 22. The period from May 22 to June 3 was devoted to the hiring and orientation of fifteen consultants, and to the acquisition of materials and research data.

Considerable difficulty was experienced in finding practitioners who were willing or able to devote their full time to a project lasting for a month. For instance, an attempt was made to obtain the services of a radio station manager to work with the Communications and Media Cluster. The sales manager of a manufacturing establishment was contacted in regard to investigating the Marketing and Distribution Cluster. Neither of these individuals was able to leave his place of business to work on the project. They did, however, agree to spend some time with the consultants who were eventually hired in these areas. As a matter of fact, practitioner after practitioner throughout the North Texas area demonstrated a willingness to discuss job function and organization with the consultants thus, there has been a wealth of information gleaned from practitioners not directly connected with this project. The names and titles of those contacted are given in the individual pamphlets together with the sources used.

It does not necessarily follow, however, that the consultants were without adequate knowledge of the area to which they were assigned. Deliberate efforts were made to select knowledgeable individuals in each cluster area who were also well-trained in research and writing.

Of the fifteen consultants selected, twelve were members of the Grayson County College faculty, one was a high school teacher from Sherman, Texas, and two were wives of professional men in the area. One of these ladies was also a practitioner in the cluster area in which she worked. These individuals produced the fifteen pamphlets contained in this publication.

The Agri-business and Natural Resources was developed by Mr. Gene Foster, who is presently Director of the Evening Division

at Grayson County College. Prior to assuming this position, Mr. Foster spent nineteen years as a teacher and director of an agriculture program in public schools. While engaged in this line of work, he was constantly involved in both row-crop and stock-farming, as well as with conservation programs in the area in which he worked. The region he was serving was a petroleum producing area which gave him an opportunity to gain extensive knowledge of this segment of natural resources. Mr. Foster was admirably suited to work in this particular occupational cluster.

The Business and Office Occupations pamphlet is the work of Mr. Charles Butler, an instructor in the Business Division of Grayson County College. Mr. Butler has taught business courses for several years at both high school and college level. Moreover, he worked for a number of years in the United States Civil Service, both as an instructor in management, and in research involving job analyses, development of job descriptions, and in the identification and placement of job functions. His experience in research related to this project was especially helpful in giving an initial direction to all those involved.

Miss Ann Reeves, Drama and Stagecraft Instructor at Grayson County College, developed the pamphlet on Communications and Media. Her experience as related to recordings, theater, publicity, and Communications and Media production in general was a major factor in selecting her to work in this cluster. Coupled with these qualifications was the knowledge that Miss Reeves has engaged in similar or related research in the past and has always produced excellent results.

The Construction pamphlet was produced by Mr. Chad Morrison, a Drafting Instructor at Grayson County College. Mr. Morrison worked for a number of years in the construction of buildings and dams as well as with a major aircraft company. His knowledge of the building trades together with his more formal training has given him the expertise to produce a pamphlet which is both informative and encouraging to those who might wish to enter construction trades.

Mrs. Janell Williams, a housewife from Sherman, developed the pamphlet for the Consumer and Homemaking Education Cluster. She is the wife of Dr. S. H. Williams of the Austin College Faculty. Mrs. Williams has a special interest in this particular area, and has read widely in the field. Her membership in the faculty family at Austin College also enabled her to draw on a number of individuals directly connected with economics, consumer patterns, and product evaluation.

Dr. Royce Castleman, an instructor in biology and ecology at Grayson County College, was assigned the responsibility for the development of the pamphlet on Environment. Dr. Castleman's past experience in initiating and teaching courses in ecology has provided him with considerable knowledge in the relatively new field of Environment. Also, since this is his area of major interest, he has studied extensively in the literature available.

Mrs. Patricia Vestal developed the Fine Arts and Humanities Pamphlet. She has taught art in the public schools and studied painting with such noted artists as Richard Bowman of Palo Alto, California, Otis Dossier of Dallas, and Franklin Faust of Sacramento. She also studied ceramics with Mansenram Singh of New Delhi, India. While in New Delhi, she worked as Art Director of the Educational Resources Center where she compiled and prepared slides and wrote booklets on Indian Art and Society. Her publications (co-authored with her husband, Dr. Theodore Vestal) include the slide lectures: The Seven Cities of Delhi, The Hindu Temple, Early Buddhist Art in India, and The Purana Quila Excavations. She also served as Director of Arts in the Creative Arts Center of Haile Selassie I University in Addis Ababa, Ethiopia. In addition, she has done commissioned portraits in several states, and her paintings have sold in the Village Gallery in Croton-on-the-Hudson, New York.

Dr. Jerry L. Ables was assigned primary responsibility for the Health Cluster. Dr. Ables has been an instructor in biology at Grayson County College for the past seven years. He has been directly involved in the development of the Licensed Vocational Nursing Program, the Associate Degree Nursing curriculum, and in the research and development of a paramedical program. Prior to his association with Grayson County College, he completed a course of instruction in Medical Technology. His experience in the field of health was the primary factor in his selection for this particular project.

Miss Janie Rogers is an instructor in English at Grayson County College. She has had considerable experience in research, writing, editing, and summer recreational work. She was assigned to produce the pamphlet on Hospitality and Recreation. In addition to the compilation of data in this area, she assisted in the organizing and editing of all the materials in this study.

The Manufacturing Pamphlet is the work of Mr. Floyd Spears, a Machine Shop Instructor at Grayson County College. Mr. Spears has spent a number of years in private industry as well as instruction in the skills upon which factory production depends. His

knowledge of this particular area together with his acquaintance with practitioners in the field determined his selection for the Manufacturing Cluster.

Mr. Jerry Young, a teacher at Sherman High School, wrote the pamphlet on Marine Science. Mr. Young is especially gifted in research and writing, having published a number of articles in professional journals. He has also written in the field of religious literature. All consultants drew upon his knowledge and experience; thus, he not only completed his primary work in Marine Science, but made a significant contribution to the project as a whole.

Mrs. Frances Bailey developed the pamphlet on Marketing and Distribution. Mrs. Bailey is an instructor in the Business Division at Grayson County College with a rather detailed knowledge of job functions in the Marketing Distribution field gained from several years experience working in the private sector of the economy. She has also done extensive research in occupational descriptions and job requirements.

The pamphlet on Personal Services is the work of Mr. Joe Hicks, a Speech Instructor at Grayson County College. He has a wide background in research, analysis, and problem solving. Some may question the rather detailed listing of relatively unskilled jobs in this cluster, but Mr. Hicks took the position that, under the Career Education Concept, many individuals leaving school at the eighth or ninth grade levels would find it necessary to move into these areas of work, and that it was just as important to provide them with detailed data on job opportunities as for those going on to higher educational levels.

The Public Service Pamphlet was assigned to Miss Mildred Powell, a Sociology Instructor at Grayson County College. In her association with students, and in teaching her classes, she is frequently brought in contact with a number of individuals in the field of Public Service. In addition, Miss Powell was in industry for several years in a position which brought her in contact with practitioners in Public Service throughout the North Texas area. As will be seen in her description of methodology used for this project, she made full and efficient use of her resources.

Mr. Edward Owens, a History Instructor at Grayson County College, prepared the Transportation Pamphlet. Mr. Owens served on active duty for three years as a Naval Officer with a sea transportation unit, and for the past several years, has participated in Naval Reserve training with an organization concerned with transportation by water, land, and air. His knowledge of the rapidly developing container shipment process was especially helpful.

The charts which accompany each pamphlet were composed by Mr. Ronnie Cole, a Journalism Instructor at Grayson County College. He also performed the lettering on the pamphlet covers. The symbols on the covers are the work of Mrs. Patricia Vestal, the consultant for Fine Arts and Humanities.

Mr. John Chumbley who is presently involved in the overall CECE project at Grayson County College was available as a general consultant and advisor. His recent graduate study and research in Career Education at Oklahoma State University proved extremely beneficial in giving the project its initial direction and in finding solutions to the problems that beset the other consultants.

Recognition must be given to Miss Lila Honts, Mrs. Dorothy Smith, Mrs. Faye Blevins, and Mrs. Sally Eudy who typed pages and pages of draft copy, mimeograph stencils, and reproduced the text of this work.

Each consultant was assigned primary responsibility for a particular occupational cluster area, but at the same time, was held to a group responsibility for the overall project. Each has developed his own discussion of methodology used, but there are some procedures that were used by all which will be discussed here.

Those involved in the project have taken the position that the names of the fifteen occupational clusters were the only constants imposed on the group. Since this particular cluster concept is relatively new, as is the Career Education Program, and since it serves as a new departure, all traditional classifications and groupings were forced to give way whenever a conflict arose between the old and the new. Terms have been changed in meaning to aid in the allocation of specific jobs to specific clusters. For instance, Marine Science by dictionary definition would apply only to salt water science; however, many of the fresh water occupations are similar to, and sometimes the same as, those involving salt water. As a result, fresh and salt water science have been combined under the general heading of Marine Science with the word "aquatic" being used in subsequent classifications rather than "marine," i.e., aquatic life, and aquatic technology.

Discussions were held at least once daily during the formative period, and at least twice weekly thereafter, extended group meetings were held to determine direction, make decisions on the assignment of specific jobs to specific clusters, discuss pamphlet format, and exchange ideas.

In order to develop some initial direction and organization, it was decided to subdivide occupational clusters into job families conforming in general to a chart developed by the Texas Education Agency for the

Construction Cluster. This was done by each consultant determining in a general sense what job functions were included in a specific cluster, and how a relationship between job functions would tend to categorize these occupations into cluster subdivisions or job families. This made possible the development of a chart for quick reference which is included in each pamphlet as well as a structure to be followed in the narrative of the pamphlet. As each consultant completed a tentative listing of job families in his cluster, these were placed on a transparency and projected for consideration by all consultants. During the discussions that followed, all recommendations for change were considered, and when the general consensus called for a modification of the job family proposal, alterations were made. Some consultants developed job families that seemed entirely appropriate when first considered but later proved awkward or unworkable. When such conflicts occurred, the consultant began anew and developed new job family categories to serve his purpose.

After occupational clusters were subdivided into job families, the consultants searched out the various jobs or occupational areas falling into these categories. A posterboard chart was then prepared for each cluster and placed on the wall to show what each individual was including in his cluster. These were subjected to periodic review by members of the group to determine areas of repetition or omission. A list entitled "Where Is This Covered?" was maintained in the general meeting room so that anyone thinking of an occupation not covered on the wall charts could enter the job on the list. This listing was consulted frequently, and, if a particular consultant found an occupation listed which was obviously in his cluster, he marked it off and wrote in the name of the applicable cluster thus assuming responsibility for that job. Whenever the placement was not so obvious, it was discussed in a group meeting, and the assignment made by common agreement, or if necessary, by the project director.

As draft copies of each pamphlet were completed, sufficient copies for each consultant were reproduced using the Kem-Fax Spirit Master process. The members of the project were given sufficient time to study each consultant's draft, and then a group critique was conducted to suggest any revision of style and content believed necessary.

This discussion of methodology has been included to show that, while each pamphlet is an individual effort on the part of a particular consultant, the overall project reflects the views of the group as a whole. And it might be noted at this point that although there were a number of areas of contention during the period of research and writing, there is no disagreement over the final product. All differences were reconciled harmoniously. No group of sixteen has ever worked together with more unity of purpose, nor has a more congenial group been brought

together for a research project.

Every effort has been made to develop a guide with an organizational style that is both practical and functional. A study of the cluster concept literature revealed that no set pattern of listings existed. As a result, the fifteen individual pamphlets in this work have been arranged alphabetically. It is hoped that this arrangement will preclude any suggestion that one career area is superior to, or more dignified than, another.

Those using this guide will encounter a profusion of cross references. During the research, it was discovered that many specific occupations applied to more than cluster. In order to minimize repetition, wherever possible, only one pamphlet gives a detailed discussion of a specific job function. At the same time, it was realized that a counselor using this guide might look under a particular cluster, and not finding some occupation listed, might well conclude that the author had merely omitted the job and look no further. An attempt has been made to prevent such an occurrence by listing general occupations whenever they apply with functional comment in the pamphlet where the job has its most common application. In other pamphlets to which the job applies, the job title has been listed with the notation, "See (Name of pamphlet where comment appears)."

No general index has been provided; however, the chart included in each pamphlet should serve that purpose. If a person is interested in a general area, he may turn to the chart for the cluster involved and look at the general classifications (job families) listed there. If the brief narrative found on the chart leads him to a desire for more information on specific jobs within that family, the boxes to the right will provide either exact job titles or an occupational area sufficiently narrow to suggest that a description of his area of interest will appear in the pamphlet narrative. Then, by turning to the applicable job family, the desired information can be found. As a matter of convenience, the job family narratives appear in the pamphlet in the same order as listed on the chart.

Whenever possible, the job identification number as listed in the Department of Labor's publication, Dictionary of Occupational Titles, is given immediately following the job title, and with the titles of related jobs that may be listed. Anyone involved in career counseling would find it advantageous to have both volumes of this publication available. It is expected, however, that this will not always be true so a brief discussion of the significance of the digits in the numbering system is attached at the end of this introduction. This presentation was prepared by Dr. Paul V. Braden of Ohio State University from the information contained in the Dictionary of Occupational Titles.

No claim is made that this classification of jobs is altogether comprehensive and definitive, or all-encompassing, but every attempt has been made to provide counselors with an orderly arrangement of occupations with as much information as possible with the data available and under the time limitations imposed on the consultants. Everyone concerned with the preparation of this material hopes that those consulting it will find it useful.

It is believed that the materials contained here provide some structuring for Fifteen Occupational Clusters where none existed before. Possibly some agency can begin with this information and conduct an in-depth study to produce a more detailed description of job functions and activities to include the relationships and commonalities which exist in regard to specific occupations.

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EXPLANATION OF D.O.T. CODES

The Dictionary of Occupational Titles is published by the United States Department of Labor to identify and define some 35,000 occupations existing within the United States. Six digit codes have been developed to be used in the classification of the various jobs. Every digit plays a significant part in the whole code; for example, the first digit serves to identify a general occupational area, and the second and third are used to narrow the area to a particular occupational group.

The last three digits are of particular interest to a counselor, particularly when he already has the job title and the D.O.T. Code, since these numerals identify the worker's function in relation to data, the extent to which a person in a job works with people, and the manipulative or operative skills required in working with things.

The tables below list the numerals used in the last three digits of the D.O.T. Code and their meaning.

(FOURTH DIGIT) DATA

- 0. Synthesizing
- 1. Coordinating
- 2. Analyzing
- 3. Compiling
- 4. Computing
- 5. Copying
- 6. Comparing
- 7. No significant relationship
- 8. No significant relationship

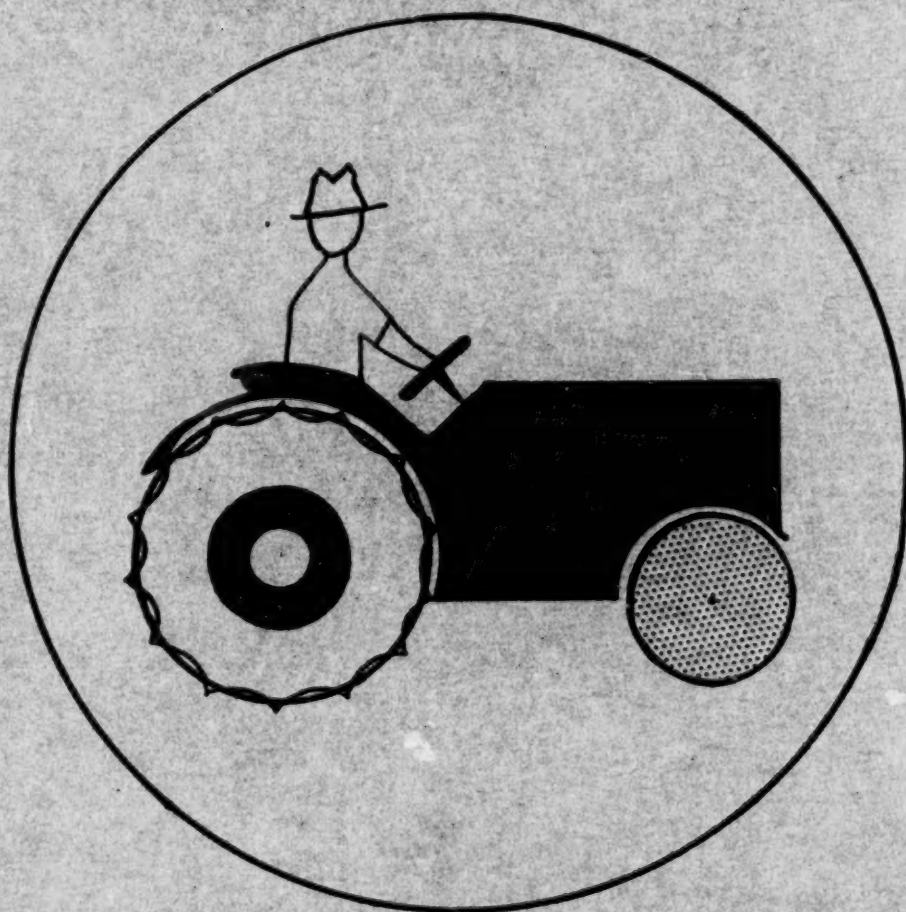
(FIFTH DIGIT) PEOPLE

- 0. Mentoring
- 1. Negotiating
- 2. Instructing
- 3. Supervising
- 4. Diverting
- 5. Persuading
- 6. Speaking-Signaling
- 7. Serving
- 8. No significant relationship

(SIXTH DIGIT) THINGS

- 0. Setting-Up
- 1. Precision Working
- 2. Operating-Controlling
- 3. Driving-Operating
- 4. Manipulating
- 5. Tending
- 6. Feeding-Offbearing
- 7. Handling
- 8. No significant relationship

AGRI-BUSINESS AND NATURAL RESOURCES



PREPARED BY
GENE FOSTER
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AGRI-BUSINESS AND NATURAL RESOURCES

I. INTRODUCTION

The need for food, clothing, and shelter has been man's basic problem throughout history. The problem is the same today; it has just become more complex with the increase in population and the many technological changes that have occurred in our society. The vast complex of Agri-Business and Natural Resources is charged with furnishing all the basic raw materials man uses for food, materials for his home or where he works, energy to move the machinery he uses whether it be one's own automobile, a jet engine, or an electric shaver; he must be kept warm or cool, clothed in the latest styles, or furnished a lake, forest or stream to relax by to contemplate all the things he has created! To say that this is big business is to put it mildly; thirty to forty percent of our labor force in the United States is engaged in some aspect of food production, processing, and delivery to the American table. The production of oil, ores, coal, and minerals employ additional millions of workers.

This Agri-Business and Natural Resources guide of careers is offered as a useful tool in choosing careers in this challenging area. The cluster is primarily concerned with production, conservation, regulating, and insuring that we as consumers receive the best product available for our use. Because of the broad area, jobs have been listed together if there was a similarity of occupational responsibility. Many jobs were omitted which were listed in the Dictionary of Occupational Titles because these are no longer applicable under the changing technology in our society. The problem of grouping in this broad area was very difficult when one considers the wide diversity of jobs in this field. An example of this diversity is found under Foreman, where a Ranch Foreman--who might work on a 10,000 acre ranch in Wyoming--is listed along with a Park Foreman, who might be working in downtown Washington, D. C. !

II. METHODOLOGY

The information within this cluster was gathered from many sources. It was coordinated where possible with other clusters found within this publication. Personal contacts were also made in areas covered in this cluster. This included visits with the

Soil Conservation Service, County Agriculture Agent, Farmer's Home Administration, Agriculture Stabilization and Conservation Service, Texas Agriculture Experiment Station, and the Texas Research Foundation, a privately endowed research station at Renner, Texas. A production superintendent of a major oil company furnished valuable information relative to the oil industry, as did the Oil Information Committee, Texas Mid-Continent Oil and Gas, Dallas, Texas. The Corp of Engineers, Tulsa District, located at Lake Texoma, Texas, furnished valuable information. Literature was surveyed at Grayson County College and Whitesboro High School which included the following:

The Occupational Outlook Handbook, published by the Bureau of Labor Statistics, U. S. Department of Labor; The Directory of Occupational Titles, Vol. I and II, published by the Manpower Administration, Department of Labor; and a printed cross reference of D. O. T. and U. S. Office of Education job title classifications. Numerous other books, publications, and pamphlets were used as resource material. Among these are the following:

American Petroleum Institute. Going Places in Oil. American Petroleum Institute (Washington, D. C., 1968).

Civil Service Commission. Federal Careers. Printing and Publications, General Services Administration (Dallas, Texas, 1965).

Hanabaugh, David H. Your Future in Forestry. Richards Rosen Press Inc. (New York, 1961).

Hutchinson, Chester S. Your Future in Agriculture. Richards Rosen Press Inc. (New York, 1965).

Sidney, Howard. Agricultural Forestry, and Oceanographic Technicians. J. G. Ferguson (Chicago, Ill., 1969).

Stone, Archie A. Careers in Agribusiness and Industry. The Interstate (Danville, Ill., 1970).

Texas Agriculture Extension Service. Extension Advances Progress. Annual Report of the Texas Agriculture Extension Service (College Station, Texas, 1971).

The AGRI-BUSINESS AND NATURAL RESOURCES cluster has been subdivided into the following job families:

A. SUPPORT AND REGULATIONS

- B. RESEARCH
- C. FORESTRY
- D. LAND AND WATER MANAGEMENT
- E. FISHERIES AND WILDLIFE
- F. MINING AND QUARRYING
- G. PETROLEUM AND RELATED PRODUCTS
- H. PRODUCTIVE AGRICULTURE
- I. PROCESSING AND MARKETING
- J. SERVICES

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual Job Families, with a listing and discussion of the function of individual occupations, are listed below:

A. SUPPORT AND REGULATIONS - The vast AGRI-BUSINESS AND NATURAL RESOURCES cluster of jobs covers many special services. The primary and regulatory body relating to this area is found in the United States Department of Agriculture and the various state regulatory agencies. Many of the jobs are considered to be governmental service and are regulated through various jobs in Civil Service. Broad areas within this job family will be discussed in an effort to explain the vast scope encompassed.

1. Inspection and Regulatory Services - Food, Feed, Grain, Dairy, Fertilizers, Chemicals, Fresh Fruit and Vegetables, Pest Control, Plant and Animal Quarantine, Mining and Oil Production occupations are those concerned with quality control, standards, grades, labeling and regulating. Specific jobs are these:

a. Food and Drug Inspector - (D. O. T. 168.287) - Inspects establishments where foods and drugs are manufactured, handled, stored, or sold to enforce city, state, and federal standards of sanitation, purity, and grading.

b. Agriculture Commodity Grader - (D. O. T. 168.287) - (Horticultural Inspector) Inspects fresh fruits and vegetables, grains, nursery stocks, and other horticultural products for conformance to federal, state, and local regulations and standards: Related jobs are Inspector, Grain - (D. O. T. 229.687); Inspector, Sweet Potatoes - (D. O. T. 229.587); Inspector, Peanuts - (D. O. T. 168.287); Inspector, Grain Mill Products - (D. O. T. 529.387).

c. Agriculture Commodity Grader, Animal - (D. O. T. 168.287) - Inspects animals and animal products using

established regulations to see if all local, state, and federal standards are met. Related job examples are Dairy Inspector - (D. O. T. 168.287); Veterinary Livestock Inspector - (D. O. T. 073.181); Veterinary Virus Serum Inspector - (D. O. T. 073.281); Veterinary Meat Inspector - (D. O. T. 168.284); Poultry Grader - (D. O. T. 168.287); Poultry Inspector, Lay - (D. O. T. 168.287); and Brand Inspector - (D. O. T. 413.684).

d. Plant and Animal Quarantine Inspector - (D. O. T. 168.287) - (Inspector, Agriculture Products in Transit) Enforces quarantine and regulatory laws to prevent spread of plant and animal diseases.

e. Check Viewer - (D. O. T. 168.287) - (Examiner; Mine Inspector; Safety Inspector) Inspects underground or open pit mines to detect unsafe working conditions and violations of state and local mining regulations or contractual agreements. May be designated as Coal Mine Inspector or Metal Mine Inspector.

f. Mineral Inspector, State - (D. O. T. 168.287) - Makes periodic examinations of coal mines to determine if coal operators are complying with state laws and regulations.

2. Rules of Trading Enforcement is the responsibility of the Department of Agriculture. There are some thirty basic laws relating to moving food and fiber from farm to consumer. The regulation of trading and marketing is necessary at such places as grain exchanges, cotton exchanges, stockyards, auction companies, and produce markets. Jobs in this area are listed in State Merit Systems or Civil Service Commission. A broad description of these jobs involves enforcing limits of speculation in grains, cotton, and other produce, supervision of the futures market, and obtaining accurate registration of prices to protect the hedging services of futures markets.

3. Market Stabilization is primarily concerned with the prevention of over production, market depression, and depletion of oil and mineral reserves. Jobs in this area involve a number of services to AGRI-BUSINESS AND NATURAL RESOURCES, such as price supports, acreage allotments, storage of commodities, sale of government-owned commodities, loans to farmers on stored commodities, and production controls. The majority of the jobs are under the Civil Service Commission. Persons with these jobs deal with producers, carriers, exporters, handlers, warehousemen, and others.

All of these activities require a working knowledge of agriculture and business.

4. Information and Marketing is a responsibility of the Agricultural Marketing Service, U. S. Department of Agriculture. The primary function is to inform the general public, producers, and buyers of the prices of agriculture commodities. Jobs in this area involve services such as crop reporting, livestock reporting, market news, market outlooks and forecasts, and statistical services. A majority of these jobs are under the Civil Service Commission. Persons with these jobs work at terminal markets for grain, livestock, and cotton with producers and harvesters as well as the Department of Agriculture in compiling information to be published in some 1,600 daily newspapers and broadcast over approximately 1,500 radio stations and 170 television stations.

5. Conservation is the Department of Agriculture's technical arm of action for soil and water conservation. Basic responsibilities of Conservation are administering a national soil and water conservation program through soil conservation districts organized under State law and controlled by farmers and ranchers; watershed protection and flood prevention; the National Cooperative Soil Survey; flood-damage reduction in eleven major watersheds; snow surveys for water-supply forecasting in the Western States; and the Great Plains Conservation Program. Specific jobs in Conservation are these:

a. Soil Conservationist - (D. O. T. 040.081) - Helps farmers and ranchers prepare a conservation plan that provides for the use and treatment of their land according to its needs and capability and one which is adapted to the type of operation the individual wishes to follow. Gives onsite technical assistance where needed to apply practices in the plans, such as terracing, stripcropping, contour farming, and establishing permanent vegetation.

b. Range Conservationist - (D. O. T. 040.081) - Helps ranchers and livestock farmers to determine the suitability of their land for the production of forage and other crops, and to develop conservation plans that will insure the use of the conservation practices needed to improve the condition of their ranges and pastures. Gives onsite technical assistance to landowners on reseeding, noxious plant control, water development, proper forage utilization, and systems of range management to increase forage

production and protect and improve the soil and water resources.

c. Soil Scientist - (D. O. T. 040.081) - Collects information about the soil through examination and records the information on maps and as field notes. Presents the information for use by farmers and ranchers and technical specialists in other fields. See Research, this pamphlet. Also see ENVIRONMENT.

d. Engineer, Agriculture - (D. O. T. 024.181) - Designs and supervises construction of earth-fill and reinforced-concrete dams for flood-prevention and water-storage dams; spillways, drop structures; drainage, irrigation, terraces, and water-disposal systems; streambank-protection works, canals, pipelines, diversions, and waterways. Makes hydrologic studies.

e. Plant Materials Technician - (D. O. T. 040.081) - Looks for and gathers seeds and plants for use in soil conservation; evaluates plants (grasses, legumes, shrubs, and trees) at plant material centers and in field plantings to determine their growth and seed habits; vigor, cold and drought resistance; cultural requirements; and range of soil and climatic adaptation. Selected plants are increased for specialized conservation uses, such as grassed waterways, wildlife shelter and food, wind barriers, and others.

f. Agronomist - (D. O. T. 040.081) - Gives technical guidance on agronomic problems to Soil Conservation Service employees and farmers and ranchers who are carrying out soil and water conservation programs. Interprets soil and crop experimental data for field use by Service personnel, land owners, and operators who are planning and applying farm and ranch conservation plans. Conducts field trials to evaluate adaptability and handling of grasses and legumes useful in soil and water conservation. Determines methods of establishing herbaceous vegetation for soil and water conservation purposes. See Research, this pamphlet.

g. Biologist - (D. O. T. 041.081) - Gives technical guidance and training to Soil Conservation Service employees in biological principles and practices that make cropland, grazing land, woodland, and farm and ranch waters produce

fish and wildlife. Formulates and develops biological methods and standards, converts new knowledge into technical recommendations, and assembles and makes available other information relating to agricultural fish and wildlife that is of use to Soil Conservation Service employees and to land owners and operators who are carrying out soil conservation programs on their land. See Research this pamphlet.

- h. Woodland Conservationist - (D.O.T. 040.081) - Gives technical guidance, training, and other assistance in woodland management to Soil Conservation Service employees. Develops technical standards in forestry for use of Service employees who provide assistance to land owners and operators in the management of their woodlands as part of coordinated soil and water conservation programs for their land. Interprets forestry techniques and experimental data for field use. Helps to evaluate soil-tree relationships and determine woodland management practices in relation to specific soil or site conditions.
- i. Geologist - (D.O.T. 024.081) - Investigates structural sites, sedimentation sources, rates and damage, and locates sources of water supply.
- j. Agricultural Economist - (D.O.T. 050.088) - Collects and analyzes economic data. Estimates benefits that may accrue from improvement work, costs and damages, and makes cost-benefit analysis of proposed improvements.
- k. Conservation Aide - (D.O.T. 040.081) - Helps professional conservationists prepare conservation farm plans. Helps farmers and ranchers establish measures called for in conservation plans.
- l. Engineering Aide - (D.O.T. 013.081) - Helps engineers with surveys, plotting notes, layout work in the field, and inspection of construction operations.

6. Education in AGRI-BUSINESS AND NATURAL RESOURCES is difficult to define since many of the jobs performed include education of the people involved. Specific areas where we expect to find persons in education include the Extension Service, the teacher of Vocational Agriculture, and the college instructor. Extension Educational programs are directed toward helping people reach desirable economic and social

goals which they have set for themselves. In Agriculture, Extension Service is a three-way partnership between land grant colleges of each state, the U. S. Department of Agriculture, and county governments. National Extension is administered through the Science and Education Division, Department of Agriculture, by the Director of Extension Service. State programs are administered by a state director with specialists aiding district and county agents. Most jobs are under the Civil Service Commission. Particular jobs which most persons are familiar with include these:

- a. County Agricultural Agent - (D. O. T. 096.128) - (Agriculture Agent; County Agent; Extension Service Agent; Farm Agent; Farm Demonstrator) Distributes information and instructions concerning improved methods of agriculture to the county rural population through practical demonstrations, personal conferences, organized groups, lectures, discussions, and publicity.
- b. District Agriculture Agent - (D. O. T. 096.128) - May supervise several County Agricultural Agents.
- c. Specialist, Extension Service - (D. O. T. 096.128) - Specialist in particular area such as Beef Specialist; Swine Specialist; 4-H Specialist; Horse Specialist; Sheep and Goat Specialist.
- d. Vocational Agriculture Teacher - (D. O. T. 041.081) - Teacher in public schools qualified by Smith-Hughes Act, 1917, to teach agriculture subjects to high school students, young farmers, and adults of the community. Directs Future Farmer of America activities, the national organization of boys and girls enrolled in vocational agriculture.
- e. Instructor, College of Agriculture - (D. O. T. 090.228) - Teachers in various fields of agriculture on college level.

D. RESEARCH - Research is systematic, intensive study directed toward fuller knowledge of the subject studied. Research may be either basic or applied. Basic research is directed toward the increase of knowledge; its primary aim is for a fuller knowledge or understanding of the subject under study rather than practical application. Applied research is directed toward practical application of knowledge. The definition of applied research differs from the definition of basic research chiefly in terms of the objectives of the investigation. Development is the systematic use

of knowledge directed toward the design and production of useful prototypes, materials, devices, systems, methods or processes. Research may be carried on by agencies of the government, private foundations, or by industry.

1. Agriculture Economist - (D. O. T. 050.088) - Studies economic aspects of agricultural problems pertaining to exploitation of rural resources and production and marketing of farm products in order to discover more efficient operating methods and improve existing farm policies of government agencies and farm associations. Forecasts production and consumption of agricultural products, basing calculations on records of past crops, labor supply, and general economic and agricultural conditions. Investigates foreign and domestic commodity exchanges, agricultural transportation problems, and tax and tariff policies to locate optimum markets. Examines farm credit structures and institutions to recommend improvements in agricultural financing. Devises methods or develops policies to increase efficiency of farm management, improve farm income, and effect favorable agricultural legislation.
2. Agriculture Statistician - (D. O. T. 020.188) - Specialist who interprets economic figures as related to agriculture.
3. Agronomist - (D. O. T. 040.081) - (Crop Research Scientist; Crop Scientist; Crop Improvement Specialist; Cerealists; Corn Investigator; Irrigationist; Plant Breeder; Soil Fertility Expert) Conducts experiments or investigations in field crop problems and develops new and improved methods of growing crops to secure more efficient production, higher yield, and improved quality. Plans and carries out breeding studies at experiment stations or farms to develop and improve varieties of field crops with respect to such characteristics as yield, quality, adaptation to specific soils or climates, and resistance to diseases and insect pests. Plans and carries out crop production studies to discover best methods of planting, cultivation, harvesting, and storage of crops and determines soil and fertilizer requirements. Usually specializes in a specific field crop, group of field crops, or a specific agronomic problem.
4. Biochemist - (D. O. T. 041.081) - (Chemist, Food; Chemist, Food Containers; Chemist, Grain; Nutritional) A classification title for chemists who specialize in the chemistry of living organisms. Ascertains reaction of foods, drugs, serums,

hormones, and other substances on the tissues and vital processes of living organisms through laboratory experiments and tests, and develops new or improved biological products and processing methods. Maintains standards of purity and quality of manufactured products by performing or supervising laboratory tests. See CONSUMER AND HOME MAKING EDUCATION for Food Chemist.

5. Biologist - (D. O. T. 041.081) - Studies origin, development, anatomy, functions, distribution, and other basic principles of plants and animals and relationship between plant and animal life, usually specializing in research centering around a particular plant, animal, or aspect of biology. Works in laboratory, green house, or field, according to nature of research. If speciality is in the study of plant and animal cells, is known as a Cytologist - (D. O. T. 041.081). Studies cells concerned with reproduction and the means by which chromosomes (particles carrying the genes or heritable characteristics) divide or unite. Studies formation of sperm and eggs in animal sex glands and origin of blood cells and tissue cells. Conducts research in physiology, (physical and chemical factors involved in cell growth), and studies influence of various physical and chemical factors upon malignant and normal cells. May be known according to speciality as Animal Cytologist, Plant Cytologist, or Cytogeneticist. See Conservation, this pamphlet.

6. Biophysicist - (D. O. T. 041.081) - Performs similar duties as Biologist. See this pamphlet.

7. Botanist - (D. O. T. 041.081) - Studies the development, physiology, heredity, environment, distribution, structure, and economic value of plants for use in such areas as agronomy, forestry, horticulture, and medicine. Identifies and classifies plants. Studies effect on plant growth of environmental factors, such as rainfall, temperature, climate, and soil. Investigates mechanics and chemistry of plant growth, development, reproduction, and maturity. Discovers and develops both wild and cultivated plants which might prove of economic value.

a. Economic Botanist - (D. O. T. 041.081) - Specializes in discovery and development of both wild and cultivated plants which might prove of economic value as crops.

b. Plant Ecologist - (D. O. T. 041.081) - Studies effect on distribution and type of plant growth of environmental elements, such as rainfall, temperature, soil, sunlight, elevation, and diseases.

c. Plant Taxonomist - (D. O. T. 041.031) - Identifies and classifies plants. Usually specializes in a major plant group, such as seed plants, algae, ferns, and mosses.

8. Dairy Technologist - (D. O. T. 041.081) - (Dairy Manufacturing Technologist; Dairy Products Technologist; Dairy Bacteriologist). Applies principles of bacteriology, chemistry, physics, engineering, and economics to development of new and improved methods in production, preservation, and utilization of milk and other dairy products such as butter, ice cream, cheese, and condensed milk.

9. Engineer, Agriculture - (D. O. T. 024.081) - See Conservation this pamphlet.

10. Entomologist - (D. O. T. 041.081) - Studies insects and their relation to plant and animal life: Identifies and classifies all species of insects and allied forms. Aids in control and elimination of harmful pests by developing new and improved insecticide and biological methods, including use of birds, natural parasites, and other enemies which prey upon destructive insects. Studies insect distribution and habitat and recommends methods to prevent importation and spread of injurious types.

a. Apiculturist - (D. O. T. 041.081) - Specializes in bee culture and breeding.

b. Sericulturist - (D. O. T. 041.081) - Specializes in silkworm culture and breeding.

11. Extension Specialist - (D. O. T. 096.128) - See Support and Regulations-Education, this pamphlet.

12. Geologist - (D. O. T. 024.081) - See Petroleum and Related Products, this pamphlet.

13. Geophysicist - (D. O. T. 024.081) - See Petroleum and Related Products, this pamphlet.

14. Geneticist - (D. O. T. 041.081) - Studies inheritance and variation of characteristics in all forms of life.

a. Animal Breeder - (D. O. T. 041.081) - Utilizes principles of genetics and knowledge of animal production problems to breed economically important characteristics such as strength, rate of maturity, disease resistance, and meat quality into animals.

b. Plant Breeder - (D. O. T. 041.081) - Utilizes principles of genetics and knowledge of plant problems to breed into economically important plants specific characteristics.

15. Horticulturist - (D. O. T. 041.081) - (Horticultural Adviser; Research Horticulturist; Breeding; Research Horticulturist, Production) Conducts experiments and investigations on problems of breeding, production, storage, processing, and transit of fruits, nuts, berries, vegetables, flowers, and ornamental bushes, shrubs, and trees. Conducts breeding experiments to develop new or improved varieties.

a. Horticultural Products Specialist - (D. O. T. 041.081) - Develops new and improved methods of handling, storage, and processing of fruits and vegetables to prevent spoilage or damage. Maintains and improves quality, and increases storage life, transport range, and seasons of availability.

b. Olericulturist - (D. O. T. 041.081) - (Horticulturist, Vegetable; Vegetable Gardening Specialist) Conducts experiments and investigations on problems relating to breeding, production, storage, processing, and transit of leafy, root, vine, and bush vegetables, such as lettuce, carrots, tomatoes, cabbage, potatoes, peanuts, melons, and beans.

c. Ornamental Horticulturist - (D. O. T. 041.081) - Conducts experiments and investigations on methods of improvement in quality and production of ornamental plants, such as flowering bulbs, herbaceous annuals and perennials, woody flower-bearing shrubs and trees, cacti, aquatic plants, vines, shrubs, and trees.

d. Floriculturist - (D. O. T. 041.081) - Specialist in flower culture.

e. Arboriculturist - (D. O. T. 041.081) - Specialist in the trimming of trees and shrubs, culture, and artistic planting of trees.

f. Pomologist - (D. O. T. 041.081) - (Horticulturist, Fruit) Conducts experiments and investigations on problems relating to breeding, productions, storage, processing, and transit of fruits, nuts, and berries.

g. Citriculturist - (D. O. T. 041.081) - Specialist in citrus fruits.

h. Viticulturist - (D. O. T. 041.081) - Specialist in grapes.

16. Market Analyst - (D. O. T. 050.088) - (Market Analyzer; Sales Analyst; Sales Research Manager) See MARKETING AND DISTRIBUTION.

17. Nutritionist - (D. O. T. 077.128) - See Biochemist, this pamphlet. See CONSUMER AND HOMEMAKING EDUCATION.

18. Pathologist - (D. O. T. 041.081) - See Geneticist, Plant Breeder, this pamphlet.

19. Physiologist - (D. O. T. 041.081) - Plant or Animal - See Geneticist, this pamphlet.

20. Research Director - (D. O. T. 189.118) - May direct specific research project in the area of plant and animal research.

21. Soil Scientist - (D. O. T. 040.081) - Works primarily in the area of conservation. See Conservation, this pamphlet.

a. Agrogeologist - (D. O. T. 040.081) - (Soil Mapper; Soil Surveyor) Studies soil structure, origin, and capabilities through field trips, laboratory experiments and examinations, and controlled experimentation. Develops and carries out programs of classifying and mapping soils according to established soil types. Conducts investigations to determine most suitable uses for a particular soil.

b. Soil Technologist - (D. O. T. 040.081) - Develops effective practices in irrigation, drainage, tillage, runoff, and erosion control techniques and structures, and land use and management, applying principles and methods of soil science, agricultural engineering, and associated fields.

22. Zoologist - (D. O. T. 041.081) - Studies all types of animals, including their origin, interrelationships, classifications, life histories, habits, behavior, life processes, diseases, relation to environment, growth and development,

genetics, and distribution.

a. Animal Ecologist - (D. O. T. 041.081) - Studies effects of various environmental influences on distribution, physical characteristics, behavior, and life history of animals.

b. Animal Taxonomist - (D. O. T. 041.081) - Studies animals for purposes of identification and classification.

c. Ichthyologist - (D. O. T. 041.081) - Specializes in study of fish and fish-like forms, such as lampreys, hags, and rays. May conduct investigations in food habits, enemies, economic importance, and propagation of fish.

23. Agricultural Aide - (D. O. T. 421.384) - Cultivates crops and attends animals according to specific instructions of research workers to carry out experiments in agronomy, animal husbandry, or some other branch of agriculture.

24. Agricultural Engineering Technician - (D. O. T. 013.181) - Applies biological and engineering knowledge, methods, and technical skills in support of agricultural engineering activities such as design of farm machinery, design and construction of irrigation, power, and electrification systems, soil and water conservation, and processing of agriculture products.

25. Biological Aide - (D. O. T. 049.384) - Aids research workers to carry out experiments in bacteriology, plant pathology, and other agricultural and biological sciences, performing routine tests and experiments concerned with greenhouses, experimental plots, hives of bees, and experimental equipment.

26. Feed Research Aids - (D. O. T. 049.384) - Feeds rations of experimental feeds to animals such as poultry, dogs, and cows, and compiles data on growth, productivity, and health of animals.

C. FORESTRY - This area of occupations is concerned with developing, maintaining, cultivating, and protecting forests, forest tracts and woodlands, and harvesting their products.

1. Forester - (D. O. T. 041.081) - (Forest Examiner; Consulting Forester; Forest Ranger; Forest Recreationist; Forest

Supervisor; Research Forester; Timber Management Specialist) Develops and manages forest lands and their resources for economic and recreational purposes. Directs suppression of forest fires and conducts fire prevention programs. Plans campsites and recreation centers. Assists in planning and carrying out projects for control of floods, soil erosion, etc. See ENVIRONMENT.

2. Forest Ecologist - (D. O. T. 041.081) - Conducts research in environmental factors affecting forests. See ENVIRONMENT.

3. Silviculturist - (D. O. T. 041.081) - Specializes in establishment and caring for timber stands. Establishes and operates tree nurseries and conducts research in problems of propagation, growth rate, seed production, etc. See ENVIRONMENT.

4. Wood Technologist - (D. O. T. 041.081) - (Forest Products Technologist) Conducts research in seasoning, preservation, and utilization of wood and its by-products.

5. Forester Aide - (D. O. T. 441.384) - Patrols forests to detect fires and to eliminate fire hazards. See ENVIRONMENT.

6. Fire Look-Out - (D. O. T. 441.168) - (Lookout Towerman; Towerman; Watchman) Commands large area from look-out station to detect fires. If detected, initiates action to control. See ENVIRONMENT.

7. Forest Fire Fighter - (D. O. T. 441.887) - Fire Crewman; Smoke Eater) Fire fighters involved in controlling outbreaks in forest areas. See ENVIRONMENT.

8. Suppression-Crew Leader - (D. O. T. 441.137) - (Crew Leader; Fire Protection Man; Forest Fire Fighter) Directs fire fighting crew in controlling forest fire outbreaks.

9. Dispatcher - (D. O. T. 193.282) - Receives field reports of fires; dispatches crews; keeps information.

10. Cruiser - (D. O. T. 449.287) - (Estimator; Land Inspector, Land Looker; Timber Estimator; Timberman; Timber Rider; Valuer) Surveys forest lands to obtain estimate of timber, prepares maps, lists conditions for appraisals, sales, logging and land use. May mark trees for cutting.

11. Logging Contractor - (D. O. T. 183.168) - (Jobber) Arranges contracts with mills, logging company, governmental agency, or individual to harvest timber.
12. Foreman, Logging - (D. O. T. 949.137) - Supervises and coordinates activities of workers engaged in felling and bucking trees.
13. Logger - (D. O. T. 940.884) - Any worker engaged in logging. May be classified as to activity: Faller, Bucker, Chokerman, Logger, All Round, Swamper, Hook Tender, and Limber.
14. Log Inspector - (D. O. T. 764.687) - Inspects logs used in manufacturing to determine use.
15. Log Grader - (D. O. T. 941.387) - Grades logs at mill pond, log deck, or in woods. May estimate footage.
16. Log Scaler - (D. O. T. 941.488) - (Lumber Scaler; Pulpwood Scaler) Estimates marketable lumber content of logs. May be designated as Deck Scaler, Pond Scaler, and Landing Scaler.
17. Saw Mill Worker - (D. O. T. 667.782) - Performs duties in preparing logs for cutting into lumber and storing cut lumber in saw mill.
18. Special Products Worker - Produces and markets special forest products.
19. Field Men, Christmas Tree - (D. O. T. 162.158) - Negotiates with farmers and woodlot owners to purchase Christmas trees for resale.
20. Woods Rider - (D. O. T. 442.137) - Supervises and coordinates activities of workers engaged in gathering resins from trees for use in making turpentine. Workers include Cupper and Tinner, Chipper, Spider, Face Cutter, Gatherer, Distiller, and Turpentine Farmer.
21. Seed Cone Picker - (D. O. T. 449.887) - Gathers seed cones from evergreen trees, such as fir, hemlock, and balsam for reforestation purposes.
22. Greens-picker - (D. O. T. 442.887) - Gathers ferns,

wreaths, huckleberry brush for sale as special products.

23. Sap Collector - (D. O. T. 442.887) - Collects sap for maple-sugar making. May be designated as Sugar Tapper, Maple Sugar Maker.

D. LAND AND WATER MANAGEMENT - Land and Water Management is the primary responsibility of the Department of the Interior, U. S. Government. This agency administers laws and manages resources on some 477,000,000 acres of public owned lands. This includes the development and conservation of water resources of arid regions in eighteen western states and the supervision of federal hydroelectric projects in the United States. Many of the jobs available in this area are covered by Civil Service. Job listings are to acquaint the counselor or student with this area of employment.

1. Range Conservationist - (D. O. T. 040.081) - See Conservation, this pamphlet.
2. Geologists - (D. O. T. 040.081) - See Petroleum and Related Products, this pamphlet.
3. Engineer, Mining - (D. O. T. 010.081) - See Mining and Quarrying, this pamphlet.
4. Engineer, Agricultural - (D. O. T. 024.181) - See Conservation, this pamphlet.
5. Surveyors - (D. O. T. 018.188) - See CONSTRUCTION.
6. Engineers, Electrical - See CONSTRUCTION.
7. Engineers, Mechanical - See CONSTRUCTION.
8. Foresters - (D. O. T. 041.081) - See Forestry, this pamphlet.
9. Writer, Technical - (D. O. T. 139.288) - See FINE ARTS AND HUMANITIES.
10. Park Recreationist - (D. O. T. 141.081) - See Forestry, this pamphlet.
11. Park Ranger - (D. O. T. 169.168) - Enforces laws, regulations and policies at state or national park. May train and

supervise park workers and concession operators. See ENVIRONMENT.

12. Park Naturalist - (D. O. T. 099.228) - Plans and coordinates exhibits and audiovisual displays and gives lectures to inform public of historic, natural, and scientific features of national park. See ENVIRONMENT.

13. Park Superintendent - (D. O. T. 188.168) - (Supervisory Park Ranger) - Supervises and coordinates activities of park rangers and other workers engaged in development, protection, and use of state or national parks. See ENVIRONMENT.

14. Park Worker - (D. O. T. 407.887) - (Park Cleaner) - Keeps grounds of city, state, or national park clean and repairs buildings and equipment.

15. Hydrological Engineer - (D. O. T. 005.081) - Designs and oversees construction of power, irrigation, and navigation projects for control and use of water. See ENVIRONMENT.

16. Irrigation Engineer - (D. O. T. 005.081) - Plans, designs, and supervises the construction of irrigation systems, including dams, canals, ditches according to soil type, climatic conditions, water supply, return flow, and other factors affecting irrigation requirements.

17. Administrative Officer - (D. O. T. 169.168) - See BUSINESS AND OFFICE.

18. Reservoir Manager - (D. O. T. 184.118) - Manages public refuge, lake, or designated land area.

19. Manager, Irrigation District - (D. O. T. 184.118) - Plans and directs construction, maintenance, and operation of irrigation system within area delegated by board of supervisors.

20. Power Plant Operator - (D. O. T. 952.782) - (Power Engineer; Powerhouse Engineer; Power Plant Engineer) - See CONSTRUCTION.

21. Powerhouse Repairman - (D. O. T. 631.281) - (Station Mechanic) See CONSTRUCTION.

22. Switchboard Operator - (D. O. T. 952.782) - (Powerhouse Attendant) - Controls powerhouse equipment and central switching in electric generating plant to distribute power output among generators according to generator capacity and

changing power demands.

E. FISHERIES AND WILDLIFE - This area of occupations is concerned with preservation, propagation, and use of fish and wildlife. Harvesting, marketing and distribution, and retailing are not considered. Some specific jobs may be explained in other areas.

1. Fish and Wildlife Specialist - (D. O. T. 041.081) - (Wildlife Specialist) - Makes survey of fish and wildlife resources and determines methods of conservation and propagation; recommends a limitation or holiday on any kind of fish or wildlife in danger of extinction.
2. Fish Culturist - (D. O. T. 041.168) - (Fish Hatchery Foreman; Hatchery Superintendent; Pisciculturist) - Supervises and coordinates activities of workers engaged in cultivating fish for use in stocking streams and ponds. May be designated according to type of fish cultivated as Food Culturist, Game Fish Culturist. See MARINE SCIENCE.
3. Game Farmer - (D. O. T. 419.181) - Breeds, raises, and sells quail, pheasants, and other game birds for restocking estates and shooting preserves. Exhibits prize birds at shows. Improves strain and develops new types. May be designated according to type of game as Pheasant Farmer or Quail Farmer.
4. Fish Farmer - (D. O. T. 436.181) - (Fisheries Aid) - Raises food fish, such as trout, to stock lakes, streams and ponds. May be designated according to kind of fish raised as Trout Farmer, Catfish Farmer. See MARINE SCIENCE.
5. Gamekeeper - (D. O. T. 451.181) - Breeds, raises, and protects game animals on federal, state, or private game preserves or farms; operates private farms; may lease to private parties for hunting. See ENVIRONMENT.
6. Hatchery Man, Fish - (D. O. T. 436.884) - Performs the following tasks in a fish hatchery: feeds fish, regulates temperature of indoor tanks, sorts fish, cleans tanks, and other related tasks. See MARINE SCIENCE.
7. Fish and Game Warden - (D. O. T. 379.168) - (Game and Fish Protector, Game Warden, Guard, Ranger) - Patrols assigned areas to prevent game law violations, investigates reports of damage to crops and property by wildlife and compiles biological data. Investigates reports of fish and game law violations, issues warnings and citations, and takes appropriate

action.

8. Hunting and Fishing Guide - (D. O. T. 452-868) - (Hunting and Fishing Guide, Guide) - Plans itinerary for hunting and fishing trips, and guides and transports sportsmen to hunting and fishing areas. See RECREATION AND HOSPITALITY.

9. Predatory Animal Hunter - (D. O. T. 451.781) - (Bounty Hunter, Forestry Hunter) - Hunts, traps, and kills predatory animals to collect bounty; hunts quarry using dogs, and shoots animals. Traps or poisons animals depending on environs and habits of animals sought. May be designated according to animal hunted as Cougar Hunter, Coyote Hunter, Wolf Hunter.

10. Trapper - (D. O. T. 451.781) - (Fur Trapper) - Traps animals for pelts, live sale, bounty, or to relocate them in other areas. May be designated according to animal trapped as Beaver Trapper, Muskrat Trapper.

11. Bird Trapper - (D. O. T. 451.781) - Traps birds to serve as brood stock or for exhibition, extermination, identification or relocation.

F. MINING AND QUARRYING - This broad area of natural resources furnishes coal, ores, minerals, rocks, gravels, clays and sands which are sources of energy, raw materials for buildings and construction, minerals for the fertilizer industry, and numerous other uses. It has been estimated that less than one percent of the earth's crust is composed of available minerals for man's use. These deposits are scattered over a widespread area and the exploration and production of these products is an important area of jobs.

1. Mining Engineer - (D. O. T. 010.081) - Determines location and plans extraction of coal, metallic ores, non-metallic minerals, and building materials such as stone or gravel. Plans location of shafts, tunnels, chambers, etc. See ENVIRONMENT, and MANUFACTURING.

2. Mining Draftsman - (D. O. T. 010.281) - Specializes in making drawings of mine machinery or structural features of mines from general design drawings or notes made by mining engineer.

3. Gravity-Meter-Observer - (D. O. T. 010.288) - Records

readings of gravity meter, torsion balance, and other gravity measuring instruments at various points in terrain to obtain data regarding gravity characteristics indicating potential source of metallic ores or petroleum deposits. May be called Magnetometer Operator.

4. Mines Safety Engineer - (D. O. T. 010.081) - Inspects underground or open pit mining areas and trains mine personnel to insure compliance with state and federal laws and accepted mining practices. Checks for unsafe timbers, cribbing, roof bolts, electric wiring, elevators, etc., to insure safe working conditions.

5. Mine Superintendent - (D. O. T. 181.118) - (Superintendent, Quarry) - Plans and coordinates activities of personnel engaged in mining. Studies surveys, calculates costs, and makes production reports.

6. Coal Inspector - (D. O. T. 030.387) - Inspects coal at surface of mine, in trucks or railroad cars, at tipples, and at preparation plant to maintain quality standards.

7. Mine Foreman - (D. O. T. 181.168) - Supervises and coordinates activities of personnel in one or more underground or surface mines, pits, or quarries. Related job areas may be designated as Section Foreman - (D. O. T. 939.138); Pit Foreman - (D. O. T. 939.138); Bank Boss - (D. O. T. 932.132); Dock Boss - (D. O. T. 224.487).

8. Fire Boss - (D. O. T. 939.387) - (Mine Examiner) - Inspects underground mines for presence of fire hazards, toxic gas, and inadequate ventilation. Reports presence of hazardous conditions. May conduct safety drills and meetings and assist in rescue operations.

9. Control Man - (D. O. T. 939.168) - Supervises and coordinates activities of workers with faulty equipment. Performs duties of foreman.

10. Machinery Operators, Mining Equipment - This area of jobs involves the operation of special machinery used in mining and quarrying operations. Related job areas include Hydraulic Operator; Jet Piercing Operator; Core-Drill Operator; Drilling Machine Operator; Churn Drill Operator; and Augerman - (D. O. T. 930.782); Universal Cutting Machine Operator; Channeling Machine Operator; and Continuous Mining Machine Operator -

(D. O. T. 930.883); Dinky Operator - (D. O. T. 919.883); Dry Placer Machine Operator - (D. O. T. 919.883); Dredge-master - (D. O. T. 939.132); Track Moving Machine Operator (D. O. T. 910.883); Duck Bill Operator - (D. O. T. 850.883); and Stripping Shovel Operator - (D. O. T. 850.833).

11. Miner - (D. O. T. 850.781) - Mines Ore, coal, or rock in underground mine, performing any combination of the following tasks in areas where high production equipment is limited by economic factors or natural formations. Cuts channels, uses hand tools such as picks and shovels, operates hand drills, may shoot off explosives and other tasks to get ore or coal from these areas. May be designated as Pick Miner, Drift Miner, Entry Man, Pillar Robber, Raise Miner, Stope Miner, Tunnel Man, Shaft Sinker, and Timberman.

12. Quarryman - (D. O. T. 930.884) - Separates blocks of rough dimension stone from mass using jackhammer, wedges, and feathers. May set off explosives. May be designated as Jackhammer Operator - (D. O. T. 930.884); Blaster - (D. O. T. 859.281); Breaker - (D. O. T. 930.887); and Quarry Worker - (D. O. T. 939.887).

13. Stone Grader - (D. O. T. 679.587) - Inspects quarried stone for size and quality and classifies according to standard schedule. Maintains production record. Related jobs are Core Splitter - (D. O. T. 930.887); Sample Tester Grinder and Hardness Tester - (D. O. T. 519.885).

14. Crusher Setter - (D. O. T. 933.884) - Adjusts gaps of cone crushers used to reduce ore to specified size.

15. Cobber - (D. O. T. 933.887) - Crushes asbestos-bearing rock using hammer. Removes fibers from rock and places them in trays according to length. Closely related job is Cleaner - (D. O. T. 934.887).

16. Dispatcher - (D. O. T. 932.168) - Coordinates movements of haulage trips in underground mines. Directs movement of special vehicles. Keeps records of train movements. Closely related workers include Chute Loader - (D. O. T. 932.887); Car Dropper - (D. O. T. 932.883); Cager - (D. O. T. 932.887); and Tipple Man - (D. O. T. 922.885).

17. Cone Operator - (D. O. T. 934.885) - (Floater; Jig Runner; Shaker Tender; Spiral Runner) - Tends cone (gravity device)

to separate slate and rock from coal. Operates slate gate at bottom and draws off impurities.

18. Coal Washer - (D. O. T. 541.885) - Operates equipment to size and wash coal for shipment or further processing. Regulates flow of coal and water. May test refuse samples to determine coal content. Related worker would be a Heavy Media Operator - (D. O. T. 541.885).

19. Mine Machinery Mechanic - (D. O. T. 620.281) - Repairs, adjusts and maintains mining machinery such as stripping and loading shovels, drilling and cutting machines, and continuous mining machines.

20. Lampman - (D. O. T. 939.884) - (Placer Miner) - Repairs and issues electric lamps used underground by miners. Tests batteries, charges batteries, and keeps records of lamps issued.

21. Brattice Man - (D. O. T. 869.884) - Builds doorways and brattices of canvas, wood, concrete block, brick or concrete as specified to control circulation of air through passageways and working areas or to support roof in areas unsuited for timbering.

22. Shaftman - (D. O. T. 899.884) - (Maintenance Man, Shaft Mechanic, Shaft Repairman) - Inspects, repairs and replaces shaft parts, such as timbers, cage guides, guard rails, and cable. Related job is a Flumeman - (D. O. T. 860.281).

23. Dragline Operator - (D. O. T. 859.883) - See CONSTRUCTION.

24. Stationary Engineer - (D. O. T. 950.782) - See CONSTRUCTION.

25. Rock Drill Operator - (D. O. T. 850.883) - See CONSTRUCTION.

26. Crushed Stone Grader - (D. O. T. 850.887) - See CONSTRUCTION.

27. Hoisting Engineer - (D. O. T. 921.883) - See CONSTRUCTION.

28. Crane Operator - (D. O. T. 921.133) - See CONSTRUCTION.

29. Bull Gang Man - (D. O. T. 929.137) - See CONSTRUCTION.

C. PETROLEUM AND RELATED PRODUCTS - The oil industry has the responsibility for supplying millions of people in our land and abroad with the energy to warm their homes, cook their meals, and power their fleets of vehicles and machinery complexes, as well as providing thousands of different kinds of petroleum and petroleum based products. Information in this section deals primarily with exploration and production. Specific jobs in this area are found in exploration, leasing, drilling, supplying technical assistance, and producing after oil has been discovered.

1. Geologist - (D. O. T. 024.081) - Explores and charts stratigraphic arrangement and composition of earth in order to locate gas and oil deposits; studies well logs, analyzing cores and cuttings, and interpreting data obtained by electrical or radioactive well logging or other subsurface surveying operations. Evaluates results of geophysical prospecting and prepares surface and subsurface maps and diagrams to show stratigraphic arrangement and composition of earth and probable deposits of gas and oil. Recommends acquisition, retention, or release of property lease or contract. Estimates oil reserves in proven or prospective fields. May specialize in one of the several phases of petroleum exploration. See PUBLIC SERVICE.
2. Petroleum Engineer - (D. O. T. 010.081) - (Directional Drilling Engineer, Chief Petroleum Engineer) - Performs engineering work concerned with drilling of wells and production of oil and gas. May be known as Gas Engineers if dealing primarily with gas production. See PUBLIC SERVICES.
3. Geophysicists - (D. O. T. 024.081) - Studies seismic, gravitational, electrical, thermal, and magnetic phenomena to determine structure and composition of the earth and the forces causing movement and warping of surface. Investigates origin and the activity of glaciers and volcanoes, and the course and phenomena of earthquakes. Employs theoretical knowledge and research data to locate petroleum and mineral deposits. Develops water-supply and flood-control programs. May specialize in a particular phase of work, as exploration, administration, research, consulting, design or teaching at the university level. See PUBLIC SERVICES.
4. Seismograph Man - (D. O. T. 024.081) - Worker who assists a member of a seismograph field party prospecting for petroleum, by performing any of a number of tasks, such as laying out seismometers and cables, developing photographic

film recordings and seismic waves, raising and lowering drill pipes and casings and pumping mud in and out of the shot hole, and cleaning, oiling and repairing drilling equipment. Relieves party members in emergencies. Classifications are made according to work specialized in such as Observer Helper - (D. O. T. 939.884); Seismic Prospecting - (D. O. T. 010.168); Prospecting-Driller Helper - (D. O. T. 939.884); Shooter Helper - (D. O. T. 939.884); and Seismograph Operator - (D. O. T. 939.884).

5. Superintendent, Drilling and Production - (D. O. T. 181.168) - Supervises, directly or through subordinate foreman, all activities concerned with drilling of oil or gas wells and production of oil and gas from wells in a large area consisting of one or more oil fields. Usually designated according to responsibility and area supervised, as District Drilling and Production Superintendent; Division Superintendent, Production and Drilling; Superintendent, Drilling and Production Field.

6. Tool Pusher - (D. O. T. 930.130) - (Drilling Foreman; Drilling Tool Foreman; Superintendent, Drilling Foreman) - Supervises drilling of oil and gas wells in a specified area consisting of one or more well sites; directs Rig Builder; supervises Cable Drillers or Rotary Drillers and drilling crews in setting up and operating drilling equipment. Procures tools, fuel, water and other services and supplies for use at rigs. May supervise operations at producing oil wells to maintain and regulate flow of gas or oil. Related jobs are Production Foreman, and Shallow-Exploratory Drilling.

7. Driller - (D. O. T. 930.782) - (Rotary Driller) - Supervises drilling operations and operates draw works that serve as a power distribution center for the raising and lowering of drill pipe and casings, and for rotation of drill pipe in well. Inspects operation of machinery and repairs or replaces worn or broken parts. Supervised and assisted by workers, such as Derrickmen, Rotary-Driller Helper, and Roustabout.

8. Rotary-Driller Helper - (D. O. T. 930.884) - (Rotary Helper, Roughneck) - Works in a crew of men (usually four) who assist in drilling operations and in running drill pipe and casing in and out of well. Other names of helpers include Catheadman, Lead Tong Man, and Pipe Racker.

9. Mud-Plant Operator - (D. O. T. 930.885) - (Mud-Mixng Plant Operator) - Operates plant in which mud or slush is mixed and pumped to drilling wells; weighs clay and sand to obtain a mud of specified viscosity. Maintains specified mixture by controlling feed of water and dry materials. Operates pump that forces mud to drilling wells where it is circulated through the well to cool the bit and wash out the drillings.
10. Supervisor-Logging Operator, Mud Analyst - (D. O. T. 010.081) - Aids other members of crew to obtain maximum utilization of servicing units and minimum disruption of drilling operations. Interprets all logs for Geologist, Petroleum and Petroleum Engineer.
11. Perforator Operator, Oil Well - (D. O. T. 931.782) - (Gun Perforator; Oil-well Gun Perforator Operator; Oil-Well Perforator Engineer) - Pierces holes in drill pipes, casings, tubings and earth formations at desired points in oil or gas wells with electrically ignited subsurface guns charged with high-explosive powders, to permit application of processes designed to assist in drilling operations or to increase productivity of wells; directs and assists Hoist-Operator; Perforator-Operator Helper; or drilling crew to assemble special tools and equipment on floor of drilling rig and to lower gun by cable into well, using special truck-mounted hoisting equipment. Observes wire-line measuring device, weight indicator, and instrument panel in truck to position gun at predetermined point. Pulls lever at control board to send electric current through cable to detonator cap or other device which fires powder charge in gun and drives bullets into walls of bore hole, to make passage for flow of oil and gas, or for cement and other fluids used in drilling and producing processes. Devises methods for freeing stuck guns, extinguishing ignited gas or oil, or meeting other emergencies. Repairs complex electriclal instruments, using electrician's hand tools, and supervises maintenance of equipment. Specialists involved include Electrical Engineers (D. O. T. 003.087), and Petroleum Engineers (D. O. T. 010.081).
12. Well Puller - (D. O. T. 930.883) - (Casing Puller; Clutchman; Pipe Puller; Pulling-Machine Operator; Rig Operator; Rodman; Rod Puller; Rod Wrencher; Tube Puller) - Pulls casing, tubing, or pumping rods out of gas or oil wells for repair and runs repaired equipment, testing devices and servicing tools into wells. Runs pressure-recording device into well and roughly interprets charts. Fishes for broken

rods and tubing, removes paraffin from perforations in casing or tubing with scraper, and performs other similar services to wells by lowering and manipulating special tools into well. May salvage casing and tubing from abandoned wells. May supervise Roustabouts in operation of hoisting equipment, in repair of well equipment, and in other well-pulling activities. Closely related jobs include Gas Well Plugger and Perforation-Washer Operator.

13. Cementer, Oil Well - (D. O. T. 930.884) - Directs and assists workers engaged in cementing annular space between gas-or-oil-well side walls and steel casings, to provide protection and control for underground operations. Directs Cementer Helper, Oil Well in mixing cement and pumping it to specific point in well. May supervise related tasks, such as locating splits in casings, killing wild gas wells by pump pressure and mixing drilling fluids.

14. Cementing-Tool Operator, Oil-Well - (D. O. T. 930.884) - (Special Tool Operator) - Uses special tools and techniques in performing more difficult cementing job of oil-or-gas-well bore holes or producing wells such as sealing permeable formations, or shutting off gas or water flow by driving cement at high pressures through perforated casings or well liners to specified points (squeeze cementing).

15. Fishing-Tool Operator, Oil-Well - (D. O. T. 930.281) - Extracts lost equipment and removes other obstacles that are encountered in bore hole while drilling oil and gas wells or that obstruct flow from producing wells, by devising methods and directing use of special tools; designs or selects tools for removing junk, stuck drill pipes, broken casings, liners, screens and other obstructions from wells. Straightens crooked holes and side tracks (drill around) lodged articles or specified earth formations, using whipstocks or other special tools. Directs the drilling crew during fishing operations, using either cable or rotary tools. May deepen wells to reach new producing strata.

16. Cable-Tool Operator - (D. O. T. 930.280) - Removes obstructions from bore holes or producing oil or gas wells, using a special string of tools attached to cable. Deepens wells, using cable drilling equipment.

17. Foreman, Pipe Line - (D. O. T. 862.131) - (Gang Supervisor; Roustabout) - Supervises and coordinates activities of crews of workers engaged in oil field work of laying pipe,

setting up pumps and other work.

18. Roustabout - (D. O. T. 869.884) - (Laborer, General; Roughneck) - Assembles and repairs oilfield equipment including pipe lines, pumps, etc. Does general oil field work.
19. Oil Pumper - (D. O. T. 914.782) - (Oil-Well Pumper; Pumper; Pumpman) - Lubricates and regulates power units, pumps and auxiliary equipment used to produce and control an artificial flow of oil from wells in which natural flow has diminished or ceased; opens and closes valves to regulate flow of oil from wells to storage tanks or into pipe lines. Reads flowmeters and gages tanks with calibrated steel tape, and makes daily production reports of the amount and quality of oil pumped and inspects lines for leaks and watches company property. Reports major break-downs and well difficulties to Production Foreman. May test and treat oil to reduce water and sediment content to specifications for pipe lines transportation. May limit oil flow as specified by proration regulations.
20. Jack-Line Man - (D. O. T. 914.782) - Pumps several oil wells from a central power plant (jack plant).
21. Pumper, Lease - (D. O. T. 914.782) - (Leaseman) - Maintains pumps and other equipment producing a flow of oil from oil wells in a specified area called a lease.
22. Pumping Switcher - (D. O. T. 914.782) - Operates pumps on a number of wells. Switches flow of oil from tank as they fill. Shuts off wells when they have produced their quota.
23. Stripper-Well Pumper - (D. O. T. 914.782) - Tends to pumping operations at one or more wells of very small productive capacity, normally in areas of fields where wells of shallow depth.
24. Manager, Leasing - (D. O. T. 186.118) - (General Manager, Land Department; Land and Lease Supervisor) - Directs land and leasing department of petroleum company to secure leases, options, right-of-ways, and special agreements covering mineral rights for drilling wells and producing gas and oil.

H. PRODUCTIVE AGRICULTURE - Occupations in this area involve producing food and fiber for man's use. It also includes the production of trees, shrubs, and flowers for his aesthetic value. This broad area basically includes farmers, ranchers, vegetable

growers, fruit growers, nurserymen, their managers, supervisors, and workers. Specific job classifications are these:

1. Poultrymen - (D. O. T. 412.181) - (Chicken Man; Chicken Raiser; Poultry Keeper; Poultry Raiser) - Raises chickens or other fowl for egg or meat production. Feeds and waters birds and cleans their houses. Gathers and sells eggs.
2. Poultry Breeder - (D. O. T. 412.181) - (Chick Culturist) - Specializes in the production of purebred chickens or other fowls. Sells pedigreed eggs to Hatchery Man, Poultry, or other buyers. May incubate and sell day-old pedigreed chicks.
3. Poultry Farmer, Meat - (D. O. T. 412.181) - (Chicken Farmer, Meat; Poultry Grower) - Raises chickens or other fowl specifically for their marketable meat.
4. Turkey Raiser - (D. O. T. 412.181) - (Turkey Rancher) - Specializes in raising turkeys for their meat.
5. Dairyman - (D. O. T. 411.181) - (Dairy Farmer) - Includes operations and occupations concerned with maintaining a herd of dairy cattle and supervising the production of milk; performing a part of all the necessary duties depending on labor, machinery and equipment available. Other workers may be known as Dairy Barn Worker, Dairy Farm Keeper, Dairy Field Hand, Dairy Hand, Dairy Helper.
6. Orchardist - (D. O. T. 404.181) - General term applied to a farmer who engages in the commercial raising of orchard fruits, such as apples, peaches, pears, and plums. May be called Fruit Grower; Fruit Farmer; Berry Farmer; Citrus Grower, Nut Orchardist; Pecan Farmer; Tung-nut Farmer; Walnut Farmer; Grape Grower; Lemon Grower; Orange Grower; etc.
7. Orchard Picker - (D. O. T. 404.887) - (Fruit Picker) - Picks apples, peaches and other orchard fruits. Climbs ladders as necessary and places fruit in a sack or basket he carries. Dumps container into boxes on the ground, being careful not to bruise fruit, and then affixes his identifying tag on box. Related workers are Orchard Pruner; Orchard Sprayer; Orchard Thinner; Fruit Worker; Orchard Fumigator; Fruit Gardener.
8. Farmer - (D. O. T. 421.181) - A general term applied to

one who engages in the profitable exploitation of the soil to raise crops and animals. The extent of his actual participation in the physical, supervisory, and administrative duties entailed depend largely on the size of the enterprise.

9. Farmer, Animal - (D. O. T. 421.181) - A classification title for farmers engaged in the commercial breeding and raising of animals other than livestock and poultry.

10. Farmer, Cash Grain - (D. O. T. 401.181) - A classification title for farmers engaged in the commercial growing of barley, buckwheat, corn, emmer and spelt, flax and grain sorghum, oats, rice, rye, or wheat. Classified under this title are the following Occupations: Corn Grower; Grain Farmer; Rice Farmer; Wheat Grower.

11. Farmer, Crop Specialty - (D. O. T. 421.181) - A classification title for farmers engaged in the commercial growing of broomcorn, cowpeas, hay, hops, trees for maple sugar and syrup, mushrooms, peanuts, potatoes, ripe field peas and beans, soybeans, sugar beets, sugarcane, sweet sorghum for syrup, and other field crops, except corn and tobacco, which, because of their economic importance, are given separate classifications. Classified under this title are the following occupations: Corn Grower; Ginseng Farmer; Hay Farmer; Hop Raiser; Peanut Farmer; Peppermint Farmer; Seed Grower; Sugar-Beet Farmer; Sugarcane Planter; and Sod Grower.

12. Cattle Rancher - (D. O. T. 413.181) - (Cattleman; Ranchman; Stockman; Farmer, Livestock) - Grows beef cattle on the open range, allowing cattle to feed on natural pastures. Supplies cattle with hay and other feeds during the winter when snow covers the range. Ships cattle to packing houses or to Cattle Farmer, Meat Production. Ranchero for Southwestern U. S. Workers include: Cowpuncher; Range Rider; and Cowboy.

13. Cattle Farmer, Meat Production - (D. O. T. 413.181) - (Cattle Feeder; Stock Feeder; Farmer, Livestock) - Breeds and raises beef cattle or buys range cattle for fattening, and sells prime cattle for slaughter. Computes and mixes rations and feeds cattle intensively. Sells and ships cattle when market is favorable and cattle are mature and fat.

14. Beekeeper - (D. O. T. 419.181) - (Apiarist; Bee Raiser;

Bee Rancher) - Maintains hives of bees for commercial production of honey and for fertilization and pollination of orchards, clover, berries, and other crops.

15. Sheep Farmer - (D. O. T. 413.181) - (Sheep Rancher; Farmer, Livestock) - Maintains flocks of sheep for meat or wool productions, or both.

16. Sheep Herder - (D. O. T. 413.887) - (Herder; Herdsman; Mutton Puncher; Sheepman; Shepherd)- Tends a flock of sheep, driving the herd to fresh pastures. Assists ewes during lambing season. Related job is a Shearer, Sheep - (D. O. T. 469.884).

17. Horse Breeder - (D. O. T. 413.181) - (Horse Raiser; Farmer, Livestock) - Breeds and raises saddle horses, matched teams of draft animals, or race horses, usually specializing in one type. Feeds and tends horses. Exhibits best stock at horse shows and fairs. Breaks and trains horses. Related jobs include Stableman; Horse Breaker; Horse Trainer; Horse Wrangler.

18. Manager, Farm - (D. O. T. 409.168) - (Farm Overseer; Manager, Agricultural; Superintendent, Farm) - Manages one or more farms for the owners, exercising independent judgment according to the size of the farm and the will of the owner. May supervise several foremen, relegating to them the duties entailed in supervising Farm Hands, Harvest Hands and Laborers. Frequently works on a commission basis, in which case he usually has extensive control over farming activities and administrative policy. Related jobs may include such occupations as Superintendent, Botanical Gardens; Superintendent, Grounds; Superintendent, Golf Course; Manager, Nursery; Manager, Flower Shop; Manager, Greenhouse; Manager, Garden Center; and Manager, Storage.

19. Foreman- (D. O. T. 429 series) - A classification title for supervisors in agriculture production who perform duties as described under various fields of agriculture. Typical of the supervisors included in this classification are Cattle Ranch Foreman, Corral Boss, Crop Boss, Farm Foreman, Field Supervisor, Fruit Farm Foreman, Group Leader, Migrant Leader, Park Foreman, Nursery Foreman, Maintenance Foreman, Planting Foreman, Cemetery Foreman, Orchard Foreman, Segundo, Sheep Ranch Foreman, Stock Ranch Foreman, Top Screw, Vegetable Packing Shed Foreman, and Poultry Farm Foreman.

20. Power Farm Machinery Operator - (D.O.T. 409.883) - Operates large types of farm tractors and the more complex types of agricultural machinery for seeding, tilling, and harvesting specialized crops and for driving agricultural machinery, silo-filling machines, wood saws, and other machines through the power take-off (pulley attachment) of the tractor. May be designated as Tractor operator, Corn-Picker Operator, Combine Operator, All Round Machinery Operator, etc.
21. Farmhand, General - (D.O.T. 421.883) - (Chore Hand; Farm Hand, Regular; Farm-wage Hand; Hired Hand; Hired Man; Wage Hand) - A classification title for jobs in the industry, listed under Farmhand, are concerned with a wide variety of duties in the raising of vegetables, grains, hay, apples, peaches, pears, livestock, and poultry. Workers in this classification perform any or all of the duties listed under the various Farm Hands, Harvest Hands, and Packing Hands. Many of the jobs are not full time, the size of the farm, number and kind of vegetables grown, and the organization of the work determining whether a worker spends all his time on a few duties, or is transferred frequently from one duty to another.
22. Farm Couple - (D.O.T. 423.999) - A man and woman, usually husband and wife, who live and work on a farm for resident or non-resident owners. Duties depend on type of farm where couple is employed. The man is usually involved in outside work, while the woman helps with domestic chores.
23. Nurseryman - (D.O.T. 406.168) - (Manager, Nursery; Nursery Farmer; Propagation Man) - Manages nursery to grow trees, shrubs, and ornamental flowering plants; determines kinds and amounts to be grown; may be designated according to type of plants or flowers grown as an Azalea Grower, Greenhouse Florist, or Evergreen Grower.
24. Nursery Worker - (D.O.T. 406.887) - Plants, cultivates, and harvests trees, shrubs, and ornamental flowering plants in nursery. May be known according to type of work accomplished such as Hot Bed Man, Flower Clipper, Fumigator, Plant Grader, Potting Man, Laborer, Landscaper, Tree Planter.
25. Tree Surgeon - (D.O.T. 409.181) - (Tree Doctor, Tree Skinner) - Prunes and treats ornamental and shade trees and

shrubs in yards and parks to improve their appearance health, and value. Related workers are Tree Surgeon Helper (D. O. T. 409.884) and Tree Pruner - (D. O. T. 404.884).

26. Horseshoer - (D. O. T. 356.381) - See PERSONAL SERVICES.

27. Animal Caretaker - (D. O. T. 419.884) - Attends to animals such as mice, rats, and guinea pigs used in experimental and biological research.

28. Irrigator - (D. O. T. 422.887) - Irrigates field and row crops by controlling water from irrigation ditch to field. Related job areas are Irrigator, Overhead and Irrigator, Standpipe - (D. O. T. 422.887) and Irrigator, Valve Pipe - (D. O. T. 422.884).

I. PROCESSING AND MARKETING - Many changes take place in raw food products on their routes from the producer to the retail store and then to the consumer. Over 5,000,000 men and women process our vegetables, pack our meat, bake the bread, and do all the other processing and distribution chores. Specific job occupations in procurement and purchasing involve buying, classing or grading the product, and performing certain product services before the product reaches the manufacturer.

1. Broker - (D. O. T. 162.158) - (Buyer, Dealer) - Purchases and collects any kind of resalable goods usually from individuals and for his own account, and resells it to wholesalers or to private individuals. Inspects and grades or appraises goods. See MARKETING AND DISTRIBUTION.

2. Sorter, Agriculture Produce - (D. O. T. 529.687) - (Sorter, Food Products) - Sorts agriculture produce such as bulbs, fruit, nuts, vegetables. May be designated according to work performed: Apple Sorter; Asparagus Grader; Citrus Fruit Packer.

3. Fruit Buying Grader - (D. O. T. 529.387) - (Fruit Inspector; Platform Inspector) - Examines, sorts, and grades fruit from load at receiving point. May be designated as Buyer, Agriculture Produce - (D. O. T. 162.158) - (Produce Buyer); Buyer, Maple Syrup - (D. O. T. 162.158); Buyer, Grain - (D. O. T. 162.158) - (Grain Buyer; Grain Elevator Agent; Manager, Grain Elevator); Buyer, Tobacco - (D. O. T. 162.158) - (Tobacco Buyer).

4. Cotton Classer - (D. O. T. 469.387) - (Agriculture Commodity Grader, Cotton; Cotton Grader) - Classifies cotton according to grade, length of staple, and character according to USDA Grade Standards.
5. Ginner - (D. O. T. 461.885) - (Cotton Gin Operator; Gin Stand Man; Gin Stand Operator; Suction Hand; Tier Out) - Separates cotton lint from seed, hulls, and waste materials using cotton ginning machinery.
6. Compress Operator - (D. O. T. 929.885) - Tends press that reduces size of cotton bales for shipment or storage.
7. Superintendent, Grain Elevator - (D. O. T. 529.138) - Supervises and coordinates activities of workers engaged in unloading, loading, cleaning, storing, and blending of grain in grain elevators. Related workers include Grain Elevator Foreman, Grain Elevator Helper, and Grain Elevator Man.
8. Drier Operator - (D. O. T. 523.885) - Operates facilities to remove moisture from harvested grain, peanut, or other crops to bring the moisture limits to where crops can be stored or shipped. A related occupation is Drier Operator Helper.
9. Drier, Dehydrator - (D. O. T. 523.885) - Operates facility to remove moisture from green crops to sell as dehydrated product. Operation may only take a few seconds to reduce the moisture content from 80 percent to 10 percent. Example of product: Dehydrated Alfalfa, Cereal Grain, etc.
10. Commission Man, Livestock - (D. O. T. 162.158) - (Commission Agent, Livestock; Livestock Broker) - Sells livestock at stockyards or auction company as agent of the owner. May specialize as Commission Man, Cattle; Commission Man, Hogs; Commission Man, Sheep.
11. Auctioneer - (D. O. T. 294.258) - Sells at auction to highest bidder. May be designated according to type property sold such as Auctioneer, Livestock; Auctioneer, Tobacco.
12. Grader, Meat - (D. O. T. 525.387) - (Beef Grader; Hog Grader; Sheep Grader; Calf Grader; Poultry Grader) - Examines animal carcasses to grade them in terms of sales value; determines grade and stamps or tags carcass.

13. Dairy Tester - (D. O. T. 469.381) - See Services, this pamphlet.

14. Egg Candler - (D. O. T. 529.687) - Inspects eggs to ascertain quality and fitness for human consumption or incubation.

J. SERVICE - Occupations in this area involve providing consumable supplies, equipment, services, technical assistance, and other services which are peculiar to the production phase of agriculture. Jobs will be discussed where possible to parallel areas of production.

1. Hatcherman, Poultryman - (D. O. T. 412.168) - (Hatchery Operator; Incubator Specialist) - Operates a hatchery concerned with the production of baby chicks for sale to Egg or Meat Producers. Supervises egg purchase, preparation for incubating, regulating temperatures, and conducts sale to prospective buyer.

2. Manager, Hatchery - (D. O. T. 412.168) - Plans, directs, and coordinates the operation of a commercial poultry hatchery.

3. Foreman, Egg Room - (D. O. T. 412.137) - Supervises and coordinates activities of hatchery workers engaged in handling, sorting, and trayng eggs prior to incubation. Performs other duties as described under Foreman.

4. Poultry Technical Advisor - (D. O. T. 429.288) - (Field Advisor; Serviceman, Poultry) - Instructs and advises Poultrymen, Egg and Meat, in developing programs for disease prevention and control and in building and equipment maintenance to improve poultry raising.

5. Poultry Technician - (D. O. T. 412.387) - Inspects poultry farms to insure that growers comply with contract standards for feeding, housing of birds, and controlling disease.

6. Chicken Sexer - (D. O. T. 412.687) - (Poultry Sexer) - Ascertainsex of baby chicks, usually when one to two days old.

7. Poultry Vaccinator - (D. O. T. 412.884) - Vaccinates poultry for diseases and prevention by placing vaccine in drinking water, dusting air with vaccine powder, injecting vaccine in eye, leg, vent, wing web, or nostril using

appropriate materials.

8. Blood Tester, Fowl - (D. O. T. 467.384) - Tests blood of poultry to ascertain disease. May be called Pullorum Tester.
9. Feed Mixer - (D. O. T. 520.885) - (Batch Mixer Operator; Feed Operator; Mash Feed Mixer Operator; Mixer Man) - Tends machine that mixes stock or poultry feed according to formula and transfers to storage or bulk truck for delivery. May be designated as Dairy Feed Mixer, Beef Feed Mixing Operator, etc.
10. Feed Mixer Helper - (D. O. T. 520.886) - (Feeder Loader; Hopper Loader; Mixer Machine Man; Mixer Man Helper) - Assists in feed-mixing operations.
11. Field Contact Man - (D. O. T. 162.158) - (Field Man; Field Technician) - Calls on producers to purchase products; discusses methods of improving production; may sell items of equipment or memberships in associations. May be required to be licensed by State. May be designated as Field Contact Man, Beef; Field Contact Man, Fruit; Field Contact Man, Dairy Products.
12. Artificial Breeding Technician - (D. O. T. 467.384) - (Breeding Technician) - Collects and packages bull semen for artificial insemination of cows. May ship to distributors for use. May inseminate cows.
13. Artificial Breeding Distributor - (D. O. T. 180.168) - Manages distributorship concerned with collecting and packaging bull semen and inseminating cows. Hires, trains, and supervises Artificial Breeding Technicians.
14. Artificial Inseminator - (D. O. T. 467.384) - (Inseminator) - Injects prepared semen into vagina of cows to breed them. Maintains necessary records.
15. Laboratory Technician, Artificial Breeding - (D. O. T. 040.381) - Works in laboratory measuring purity of bull semen and develops methods of preserving and processing semen for artificial insemination. Keeps necessary records used in identifying source of sperm. Additional duties are performed to insure success of the industry.
16. Dairy Tester - (D. O. T. 469.381) - (Cow Tester; Dairy

Herd Tester; Milk Tester) - Travels from dairy farm to dairy farm testing the milk from each cow in a milking herd at periodic intervals.

17. Representative, Breed Associations - Special representative of Breed Associations: promotes breed at shows, sales, farm meetings; may serve particular area. Example: Secretary, American Hereford Association; Fieldman, Texas Hereford Association.

18. Veterinarian - (D. O. T. 073.108) - (Veterinary Doctor) - Studies and treats diseases of animals; analyzes disease or injury and treats animals surgically or medically. See HEALTH SERVICES.

19. Veterinary Hospital Attendant - (D. O. T. 356.874) - (Veterinary Assistant) - Cares for animals under treatment in animal hospitals for disease, injury, etc.

20. Laboratory Technician, Veterinary - (D. O. T. 073.381) - See HEALTH SERVICES.

21. Salesman - (D. O. T. 260.289) - Sells specific product or service related to agriculture production. Example: Feed Salesman, Fertilizer Salesman, Insecticide, Herbicide or Pesticide Salesman, Nursery Salesman, and Flower Salesman. See MARKETING AND DISTRIBUTION.

22. Farm Machine Set-Up Man - (D. O. T. 624.381) - Erects and assembles, adjusts and demonstrates farm machinery; may deliver to purchaser.

23. Farm Equipment Mechanic - (D. O. T. 624.281) - Maintains, repairs, overhauls farm machinery of all types. Related workers are Assembly Repairman - (D. O. T. 624.781) and Greaser - (D. O. T. 624.884).

24. Tractor Mechanic - (D. O. T. 620.281) - Diagnoses mechanical failure of and repairs tractors and tractor components according to manuals, factory specifications and knowledge of engine performance. May be assisted by Tractor Mechanic Helper - (D. O. T. 620.884).

25. Seed Grower-Agriculture - (D. O. T. 406.181) - (Seedman; Farmer, Crop Specialty) - Specializes in the production of pure seed of definite varieties for sale to all types of farmers

and growers; cultivates crops and gathers seeds carefully to prevent infiltration of other varieties of seed. Packs and ships seeds in containers. May develop new varieties of plants resistant to disease, insects, and blights.

26. Field Supervisor, Seed Production - (D. O. T. 429.131) - Directs and coordinates activities of farmers who produce seed stocks for commercial seed companies and prevents cross pollination.

27. Seed Analyst - (D. O. T. 040.381) - (Farm-Seed Specialist) - Tests seed for germination, purity, and weed content.

28. Seed-Cleaner Operator - (D. O. T. 551.885) - Seed-Cleaning Machine Operator; Seed-Cleaner) - Tends one or more cleaning machines, cleaning trash, weed seeds, etc., from seed. Treats for disease prevention. May clean grain for farmers before marketing.

29. Contract Farmer - (D. O. T. 409.883) - (Farmer; Custom) - Performs any combination of duties entailed in preparing soil, planters, cultivating and harvesting crops. Example: Grass Sodder; Custom Cotton Harvester; Custom Combiner.

30. Harvest Contractor - (D. O. T. 469.158) - (Agriculture-Contract, Picker) - Contracts with farmers, or groups of farmers, to provide harvesting services. May include hand crews, custom equipment, transportation, etc., to harvest, load, move and store crops. Related areas may include a Contractor, Field Hauling - (D. O. T. 469.168).

31. Scout - (D. O. T. 465.381) - (Pest Control Worker) - Locates and exterminates plant and tree pests and diseases; mixes herbicides, insecticides, and fungicides according to type of infection or infestation to be treated. See ENVIRONMENT.

32. Exterminator Supervisor - (D. O. T. 389.138) - Supervises and coordinates activities of Exterminators engaged in destroying vermin with insecticides or fumigants.

33. Blight Control Foreman - (D. O. T. 465.137) - Supervises and coordinates activities of workers engaged in control of blight-producing diseases. Assigns workers, selects chemicals, pesticides, etc.

34. Fumigator, Orchard - (D. O. T. 465.781) - Kills insect pests on fruit trees by trees by treatment with hydro-cyanic acid gas.
35. Airplane Pilot, Agriculture - (D. O. T. 196.283) - (Aerial Application Pilot; Crop Dusting) - Pilots airplane or helicopter at low altitudes over agriculture fields to dust or spray fields with seeds, fertilizer, or insecticides.
36. Weed Inspector - (D. O. T. 465.781) - Locates and destroys noxious weeds in rural areas. Sprays infected area with appropriate materials.
37. Feed Store Operator - May handle feed, seed, fertilizer, drugs, herbicides; insecticides, and hardware materials used in producing crops, livestock, etc. May employ Sales Clerks, Machinery Operators, and Floor Workers.
38. Farm Implement Dealer - Deals in various equipment needed in production such as tractors, combines, and other special equipment.
39. Irrigation Supply Operator - Handles pumps, pipes, sprinklers, motors, etc. used in irrigation.
40. Water-Well Driller - (D. O. T. 859.782) - (Drilling Machine Operator; Well-Borer) - Sets up and operates drilling rig to drill wells for water supply for household and irrigation use.
41. Owner-Operator, Fertilizer Plant - Analyzes soil tests, selects raw materials and mixes to given formula loads and may assist worker in applying fertilizer to given area. May rent or loan special application equipment to user such as bulk fertilizer spreader and liquid fertilizer tanks.
42. Cooperative Wholesale Supplier - Services provided by group or member producers. Services include petroleum products, feed, fertilizers. May employ the following workers: Managers, Cooperative Service; Fieldman, Co-operative Service. Workers depend on type of service rendered.
43. Landscape Architect - (D. O. T. 019.081) - (Community Planner; Land Planner; Site Planner) - Plans and designs development of land areas for such projects as parks, highways,

schools, land subdivisions, and commercial, industrial, and residential sites. See ENVIRONMENT.

44. Landscape Gardener - (D. O. T. 407.181) - (Landscaper)- Plans and executes small scale landscaping operations for private homes and small business organizations. See PERSONAL SERVICES.

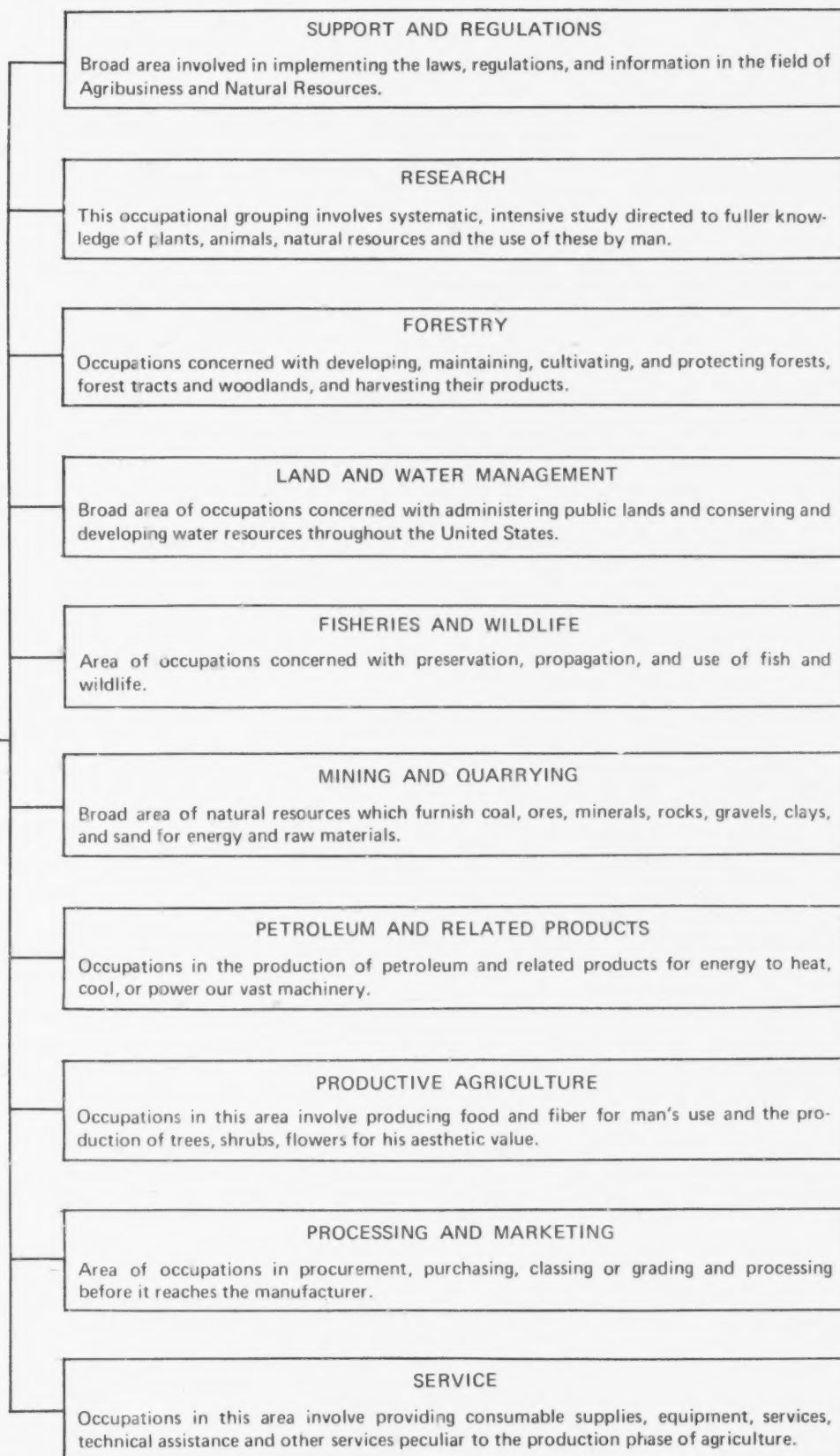
45. Soils Tester - (D. O. T. 029.181) - (Laboratory Tester) - Runs analysis on soil sample, determining organic matter, soil pH, major soil elements, and minor elements to aid producer in determining fertilizer requirements for various crops.

46. Editor, Farm Magazine - (D. O. T. 132.038) - Edits and publishes a farm magazine to inform persons in agriculture production on latest developments in livestock, poultry, swine, sheep, and other related subjects. See COMMUNICATIONS AND MEDIA.

47. Reporter, Farm Magazine - (D. O. T. 132.268) - Gathers and writes articles published in farm magazines. Normally is trained in both agriculture and journalism. See COMMUNICATIONS AND MEDIA.

48. Radio Farm Director - (D. O. T. 159.148) - Gathers news stories on agriculture developments, meetings, market news, and other general interest stories about rural America and broadcasts on a regularly scheduled basis. May double as Farm Director, Television. See COMMUNICATIONS AND MEDIA.

**AGRIBUSINESS
AND
NATURAL
RESOURCES**





BUSINESS AND OFFICE



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BUSINESS AND OFFICE

I. INTRODUCTION

There are societies in which there are no occupational choices. One of the outstanding characteristics of our culture is the right of the individual to choose his work. Another one is the high degree of specialization. These two characteristics make it necessary that some sort of organization be made to help the counselor in his duties. This cluster idea is a movement in the direction of solving this organizational problem.

The BUSINESS AND OFFICE pamphlet may be used in the preparation of people to enter a business career, or having entered upon such a career, to render more efficient service therein and to advance from their present levels of employment to higher levels.

The Office Section of this cluster may be defined as those areas that include one or more of the duties assigned to office and business workers who do not specialize in major subject areas such as Accounting, Personnel, and others.

It is the purpose of this work to assist the counselor in the various phases of Business that concern the interested students.

II. METHODOLOGY

The method utilized in determining job family areas in this cluster was accomplished in three major steps. The first step was to select the broad areas based on experience and related material. After having been determined, these areas were cross-checked to see if there were duplications in the other clusters. Second, research was continued, ultimately resulting in tentative job family areas. Third, these results were presented to the entire group for their critique,

thus arriving at the established job family area. These areas are Accounting, Computer, Secretarial Sciences, Personnel, Finance-Insurance-Real Estate, and Office (Clerical).

The remaining objective was to research, write, and edit the job occupations in this cluster.

The basic documents utilized in this cluster were The Dictionary of Occupational Titles and Occupational Outlook Handbook published by the United States Department of Labor. The other supporting references are listed below.

The facilities of Grayson County College Library were most helpful in the phase of cross-checking the various sources to eliminate duplications of occupations in this cluster.

Unger, Maurice A. Real Estate Principles and Practices. Fourth Edition. South-Western Publishing Co. (Cincinnati, Ohio, 1969).

Ginzberg, E., Ginzberg, S. Axelrad, Hermia, S., Occupational Choice. Columbia University Press (New York, 1951).

Terry, Richard D., Office Management, And Office Control. Richard D. Irwin Co., (New York, 1969).

Tonne, Herbert A. Principles of Business Education. Gregg Company (Chicago, 1953).

Supervisory Development Staff, Engineering Extension Service, Texas A. & M. University, Industrial Education Service and Texas Education Agency. Principles of Supervision.

A. ACCOUNTING - The job family area of Accounting is defined as the science, art, or system of keeping, analyzing and explaining accounts. The jobs listed fall within this definition. There are several jobs that are listed here because they fit the above definition closer than they do any other cluster. For example, Statistician does not exactly fit here, but it is more appropriate here than elsewhere.

1. Accounting Manager (Senior) (Supervisor) - (D.O.T. 160.188) - Responsible for designing, maintaining, and evaluating a general accounting system for an organization.

2. Accountant, Cost - (D.O.T. 160.188) - Installs and maintains systems for organization with procedures not ordinarily supported by standard accounting system.
3. Accountant, Budget - (D.O.T. 160.188) - Estimates expenditures expected. Submits overall reports to management.
4. Accountant, Property - (D.O.T. 160.188) - Designs system to provide effective control. Identifies and keeps records of all company owned or leased equipment, buildings and other property.
5. Accountant, Certified Public - (D.O.T. 160.188) - Meets state legal requirements for public practice (education and experience).
6. Accountant, Junior - (D.O.T. 160.188) - Verifies, audits, checks, and analyzes accounts. Prepares statements and works under supervision of more highly trained personnel.
7. Accounting Clerk - (D.O.T. 219.488) - Performs variety of routine calculating, posting, and typing duties in accounting. Other related jobs are Voucher Clerk, Payroll Clerk, Additions and Betterment Clerk, and Typist.
8. Accountant, Systems - (D.O.T. 160.188) - Creates and installs special accounting systems for organizations which cannot use standardized system.
9. Bookkeeper - (D.O.T. 210.388) - Keeps one section or set of financial records. Related jobs are Accounts Receivable, Christmas Club, Interest-Accrual, Safety Deposit, and Savings.
10. Accountant, Tax - (D.O.T. 160.188) - Prepares federal, state or local tax returns of individuals, business establishments, or other organizations. Specializes in specific phases of tax accounting.
11. Accountant, Machine Processing - (D.O.T. 160.188) - Coordinates mechanized accounting operations. Confers with management to adapt accounting and record-keeping systems to machine accounting processes.

12. Statistician - (D.O.T. 020.188) - Discovers general facts. Interprets quantitative information by application of statistical methods to a mass of related individual observations in field of designated specialization. See also MARKETING AND DISTRIBUTION.
13. Mathematician - (D.O.T. 35.76) - Determines mathematical principles involved and most efficient methodology for solutions of problems pertaining to accounting functions.
14. Clerk, Trust - (D.O.T. 231.588) - Specializes in trusts, mortgages, and legal transactions. (See Accounting Clerk, No. 7 above).
15. Accounting Representative - (D.O.T. 164.168) - Plans and directs overall accounting program of organization.
16. Accounts Supervisor - (D.O.T. 168.168) - Responsible for one entire phase of accounting system. Supervises personnel handling various phases of accounting.

B. COMPUTER - This job family area may be defined as the electronic method of storing instructions, performing complex calculations, or compiling, correlating, and selecting data. The number and kinds of employees needed for these functions vary for different computers. This listing of job occupations is intended to be broad enough to include all computer systems.

1. Data-Methods Analyst (System Analyst) - (D.O.T. 012.168) - Analyzes business problems. Makes formulation and conversion to programmable form. Changes material to electronic-data processing system.
2. Data Typist - (D.O.T. 213.588) - Converts alphabetic, numeric, and symbolic data into coded form. Processes punch cards and tape.
3. Key-Punch Operators - (D.O.T. 213.582) - Prepares punched cards for overall operation. Proofs material before and after punched cards are prepared. Assists in designing card phase for specific job or project.
4. Console Operator - (D.O.T. 213.582) - Examines the programmer's instruction sheet for the run and ascertains procedure to be followed. Readies the equipment. If malfunction occurs, trouble-shoots for basic cause of error.

5. High Speed Printer Operator - (D.O.T. 213.382) - Wires plugboards. Watches for lights on equipment which signify errors. Specializes on one type of machine.
 6. Programmer - (D.O.T. 213 series) - Converts scientific, engineering, and technical problem formulations to format processable by computer.
 7. Data-Reduction Technician - (D.O.T. 213 series) - Analyzes new data recorded on magnetic tape punched cards, and photographic film and other media to electronic format.
 8. Tape Librarian - (D.O.T. 233.387) - Responsible for storing tape. Maintains control record on all tapes. Organizes a filing system to fit the purpose of each project.
 9. Auxiliary Equipment Operator - (D.O.T. 223.387) - Stores tapes. Assists Key-Punch Operator in his function. (See No. 3 above).
 10. Card-To-Tape Converter Operator - (D.O.T. 213.382) - Wires simple plugboard. Interprets signals from machine light panels. Identifies situations preventing system from operating properly.
 11. Sorting Machine Operator - (D.O.T. 213.885) - Processes, runs punched card through sorting machine. Possesses knowledge of overall program of data processing.
 12. Tabulating Machine Operator - (D.O.T. 213.782) - Inserts batches of punched cards into machines. Wires up plugboard with process used on specific project.
 13. Teacher-Computer - (D.O.T. 099.228) - Instructs in specialized area of data processing. For additional information, see PUBLIC SERVICE.
- C. SECRETARIAL SCIENCE - This job family area involves the specialization of keeping records, taking dictation, composing, editing, and creative writing. A basic requirement in this area is a knowledge of advanced typewriting. Since there are many different secretarial functions, only the most important are listed.

1. Stenographer (Secretary) - (D.O.T. 201.368) - Schedules appointments, gives information to callers, takes dictation, relieves officials of minor administrative and business details. Supervises clerical workers.
2. Legal Secretary (Stenographer) - (D.O.T. 201. series) - Does above duties of stenographer in legal business. Requires specialized knowledge and training in the field of law.
3. Medical Secretary (Stenographer) - (D.O.T. 201. series) - Required to have basic stenographer skills and knowledge. Does specific duties such as medical records, charts and correspondence in medical area. Must be familiar with medical terminology.
4. Court Reporter - (D.O.T. 202.358) - Records examination, testimony, judicial opinions, and other legal records. Uses typewriter or recording machine. Related job: Court Machine Operator.
5. Court Clerk - (D.O.T. 202 series) - Keeps records of county and handles court dockets. Coordinates records between Clerk's Office, Attorney's Office, and Court. Assists Court Reporters in various phases of their work. Handles jury summons, records. Maintains court appeal records for Court. Processes all legal papers for Court. May work through related offices such as District Clerk's Office.

D. MANAGEMENT - The management area is the plus or minus sign of the success of a business. It is defined as the coordination of those activities that deal with planning, directing, and controlling of personnel. This job family area has various levels, and the job occupations are listed to include all levels.

1. Executive - (D.O.T. 195.368) - Concerned with or pertaining to the executions of the conducting of business affairs within a business.
2. Junior Executive - (D.O.T. 195.368) - Performs basically same functions as Executive. Supervised by Executive.
3. Public Relations Worker - (D.O.T. 165.068) - Plans and conducts programs designed to procure publicity for

organization. Related jobs are Director, Manager, Press Agent, Promotion Man.

4. Supervisor - (D.O.T. 195. series) - Handles people or directs activities of others. Works through people to accomplish productive work.
5. Instructor, Teacher - (D.O.T. 099.288) - Trains and educates personnel in management area. For additional information, see PUBLIC SERVICE.
6. Director, Educational - (D.O.T. 186.118) - Organizes, administers and conducts training in management organization.
7. Manager, Owner - (D.O.T. 195.series) - Directs supervisory personnel toward specific objectives. May be owner of business.
8. Assistant Manager - (D.O.T. 195. series) - Performs same duties as Manager. (See No. 7 above.) Supervised by Manager.
9. Organizational Methods Examiner - (D.O.T. 620.068) - Analyzes problems in management. Gathers, relates, and identifies data with variables required for research. Writes follow-up reports.

E. PERSONNEL - This job family area deals with the functions of recruiting, interviewing, and hiring of people engaged in any work, enterprise, service, or establishments. It further involves recording job descriptions and classifications, and personnel discharge, death, and/or retirement.

1. Supervisor - (D.O.T. 205.138) - Supervises and coordinates activities of workers engaged in compilation and maintenance of personnel records.
2. Interviewer - (D.O.T. 166.268) - Interviews job applicants. Evaluates people for special jobs. Verifies written reports and test data for possible qualification.
3. Recruiter - (D.O.T. 166.268) - Travels to area geographically distant from company operations. Interviews applicants for position openings.
4. Manager (Agent) - (D.O.T. 187.188) - Manages

functions of business. Coordinates objectives with those of workers.

5. Investigator (Personnel) - (D.O.T. 205.368) - Checks and verifies background of persons applying for job. Compiles detailed report of findings.
6. Personnel Clerk - (D.O.T. 205.368) - Does office duties involving personnel records. Duties include filing, typing, wage scales, absences, promotions, training statuses, and discharges.
7. Personnel-Records Clerk - (D.O.T. 205. series) - (See Personnel Clerk, No. 6 above.) Specializes in one phase of No. 6.
8. Personnel Relations Administrator - (D.O.T. 106.188) - Organizes, directs, and coordinates personnel relations of organization.
9. Personnel Monitor - (D.O.T. 199.187) - Supervises personnel and facilities for results of programs, policies, and regulations of organization.
10. Personnel Technician (Job Analyst - (D.O.T. 166.085) - Collects, analyzes and develops occupational data concerning jobs and job qualifications.
11. Position Classifier - (D.O.T. 166.188) - Analyzes and evaluates position to determine level of difficulty and responsibility. Assists in converting data to salary requirements.
12. Personnel Counselor - (D.O.T. 39. series) - Instructs and advises job seekers in field of employment best suited. Evaluates personality, education, and experience in job analysis. May be inhouse person or consultant for organization. Related jobs are Vocational Counselor and Vocational Educator.
13. Teacher-Personnel - (D.O.T. 099.288) - Instructs in specialized area of personnel. For additional information, see PUBLIC SERVICE.
14. Utilization Technician - (D.O.T. 205. series) - Specializes in phases of No. 10 and 11 when required.

15. Administrative Officer - (D.O.T. 169.168) - Coordinates office services. Studies management methods in order to improve workflow. Issues and interprets operating policies. Directs services, such as maintenance, repair, supplies, mail, and files.

F. FINANCE--INSURANCE--REAL ESTATE - The three aspects of this job family area are so closely related that they are listed as one overall area instead of three individual ones.

The scope of the Finance portion of this area ranges from banks to stock exchanges. They all fall within the definition of Finance, which is the science of managing money matters. To avoid the problem of becoming so detailed that the final product is questioned, a selection of major occupations has been made in this area. For example, banking, savings and loans, and stock exchange are very similar in function, so only one job description is listed. The other jobs will be cross referenced to it to avoid putting down each job and defining it twice.

The insurance section of this job family area involves the function of insuring against loss. To accomplish this goal, a large number of occupations are required. The job specialties are such that I have listed those broad occupations required to accomplish the Insurance definition.

Real Estate, which is the last part of this job family area, may be defined as land and generally whatever is erected, growing, or affixed to the land. It is further defined as any transaction involving the land. Again, I have selected the major occupations required to handle transactions in the Real Estate area.

1. Finance

a. Financial Analyst - (D.O.T. 020.188) - Conducts statistical analyses of information affecting investment programs of public, industrial, and financial installations. Related areas are found in banks, insurance, and investment houses.

b. Financial Economist - (D.O.T. 020.188) - Studies nature of money, credit, and credit instruments and operations to develop monetary policies and to forecast financial activity.

- c. Financial Aids Officer - (D.O.T. 039.81) - Directs and coordinates programs of scholarship, grants-in-aid, loans, and student employment. Coordinates activities of school officials.
- d. Bank Cashier - (D.O.T. 186.168) - Directs bank's monetary programs, transactions, and security measures in accordance with regulations. Related jobs are found in savings and loans, investment houses, and stock exchanges.
- e. Banking Reconciliation Clerk - (D.O.T. 186. series) - Reconciles records involving customers and organizations. Related jobs are savings and loans, investment houses, and stock exchange.
- f. Bank President - (D.O.T. 186.118) - Develops and administers policies of organization in accordance with corporate charter. Related jobs are found in savings and loans, investment houses, and stock exchanges.
- g. Bank Vice-President - (D.O.T. 186.118) - Directs activities of regional bank office, branch bank, or administrative bank division, as designated by board of directors, or administrative bank division, as designated by board of directors. Related jobs are found in savings and loans, investment houses and stock exchanges.
- h. Bank Auditor - (D.O.T. 160.188) - Examines and analyzes records, prepares reports and certifies results. Related jobs are found in savings and loans, investment houses, and stock exchanges.
- i. Bank Teller - (D.O.T. 212.368) - Receives and pays out money and negotiable instruments involved in banking transactions. Related jobs are found in savings and loans, investment houses, and stock exchanges.
- j. Bank Loan Officer - (D.O.T. 186.288) - Examines and evaluates applications for lines of credit, installment credit, or commercial, real estate, and consumer loans. Recommends approval or disapproval. Related jobs are found in savings and loans, investment houses, and stock exchanges.

k. Accountant Analyst - (D.O.T. 219.388) - Computes charges to be made against commercial accounts for service rendered. Related jobs are found in savings and loans, investment houses, and stock exchanges.

l. Investment Counselor - (D.O.T. 165.03) - Gives information regarding stocks, bonds, market conditions, and history of company to customers or organizations. Related jobs are found in banks, savings and loans, and stock exchanges.

m. Credit Manager - (D.O.T. 108.168) - Manages functions of credit and collections department of organization. Related jobs are found in banks and savings and loans.

n. Teacher (Instructor) - (D.O.T. 099.288) - Instructs in specialized area of finance. For additional information, see PUBLIC SERVICE.

2. Insurance

a. Attorney - (D.O.T. 110.118) - Advises management of Insurance organization on legality of insurance transactions. Related jobs are found in savings and loans, banks, and stock exchanges.

b. Insurance Clerk - (D.O.T. 219.388) - Evaluates policies involving security for authorized loans. Handles transactions regarding loans.

c. Insurance Examiner - (D.O.T. 168.268) - Evaluates complaints and conformity of insurance with standards of states.

d. Insurance Inspector (Credit Reporter) - (D.C.T. 249.368) - Investigates history and credit status of individual or business establishments. Related jobs are found in savings and loans, investment houses, and stock exchanges.

e. Insurance Safety Man - (D.O.T. 168.168) - Inspects insured property to evaluate conditions of safety. Promotes safety programs.

f. Insurance Actuary - (D.O.T. 020.188) - Applies

knowledge of mathematics, probability, statistics, principles of finance, and insurance data for company regarding rates and distribution of dividends. Related jobs are found in savings and loans, banks, investment houses, and stock exchanges.

g. Insurance Adjuster (Claims) - (D.O.T. 241.163) - Investigates claims for loss or damage both inside and outside court jurisdiction.

h. Insurance Salesman - (D.O.T. 250.258) - Sells insurance to new and present clients. Recommends amount or type of coverage. Specializes in types of insurance such as Fire, Life, Auto, and Marine Insurance. Related job is Securities and Stock Exchange Salesman.

i. Borderneau Clerk - (D.O.T. 209.388) - Prepares application for insurance on property in which company has interests.

j. Insurance Checker - (D.O.T. 219.488) - Verifies accuracy of insurance records as required by regulations.

k. Teacher, Instructor - (D.O.T. 099.288) - Instructs in specialized areas of Insurance. For additional information, see PUBLIC SERVICE.

3. Real Estate

a. Real Estate Broker - (D.O.T. 250.388) - Negotiates for a fee, the purchase, sale, exchange, lease, or rental of real estate or any interest therein.

b. Real Estate Salesman - (D.O.T. 250.388) - Performs same functions as broker, except he works under broker's supervision.

c. Real Estate Appraiser - (D.O.T. 191.287) - Attempts to obtain a just and fair valuation of a parcel of real estate.

d. Real Estate Escrow Clerk - (D.O.T. 169.388) - Delivers a scroll, writing, or deed into hands of third person after happening of a contingency or

performance of a condition.

- e. Real Estate Counselor - (D.O.T. 250. series)
- Determines and advises on alternate courses of action regarding highest and best use of real estate holdings.
- f. Real Estate Clerk - (D.O.T. 219.388) - Performs any combination of following duties: rental, sale, lease, and management of real estate.
- g. Real Estate Location Writer - (D.O.T. 249.388)
- Condenses property description from legal description in mortgage document. Verifies preparation of records for loans disbursed by closing division.
- h. Real Estate Posting Clerk - (D.O.T. 219. series)
- Keeps written records of duties performed by Real Estate Clerk.
- i. Real Estate Expense Posting Clerk - (D.O.T. 219. series) - Maintains written records of expense ledger, voucher, or other data concerning expenses on specific area.
- j. Teacher, Instructor - (D.O.T. 099.288) - Instructs in specialized area of Real Estate. For additional information, see PUBLIC SERVICE.

G. OFFICE (CLERICAL) - If more than thirteen million people were employed in this area in 1970, it must be considered as an important job family area in this cluster. In the work force, over fifty percent of the girls who complete high school go to work as office clerks. This area may be defined as those office and clerical duties not requiring knowledge of systems or procedures.

- 1. Clerk, General Office - (D.O.T. 219.388) - Copies data and compiles records and reports. Computes wages, taxes, premiums, commissions, and payments. Sorts, files, and proofreads material. Types, answers phone, and operates office duplicating equipment.
- 2. Clerk, General - (D.O.T. 209.388) - Performs duties not requiring knowledge of systems or procedures. Writes or types bills. Proofreads records or forms. Addresses

envelopes or packages by hand or with typewriter. Stamps, sorts, and distributes mail. Operates office duplicating equipment.

3. Clerk, Typist - (D.O.T. 209.388) - Performs general office clerical duties requiring use of typewriter in majority of duties.

4. File Clerk - (D.O.T. 206.388) - Files correspondence, reads incoming material, and sorts according to file system. Locates and removes material from files when requested. Keeps control record of filing material.

5. Tax Clerk - (D.O.T. 219.388) - Computes state or federal taxes on sales transactions on articles produced. Keeps records of amount due and paid.

6. Mail Clerk - (D.O.T. 231.588) - Sorts incoming mail for distribution. Dispatches outgoing mail for delivery.

7. Router - (D.O.T. 239.588) - Stamps, stencils, letters, or tags packages, boxes, or lots of merchandise to indicate delivery date. Determines routes by using standard charts.

8. Shipping Clerk - (D.O.T. 222.138) - Supervises and coordinates activities of workers engaged in packing and shipping merchandise material. Keeps records of shipment. Related jobs are Delivery and Order Man, Shipper, and Shipper Packer.

9. Order Clerk - (D.O.T. 219.368) - Processes orders for material or merchandise received by mail, telephone, or personal customer or company.

10. Business Machine Operator - (D.O.T. 207. series) - Operates various office machines, such as Xerox, posting, photographic, etc. Responsible for duplicating office papers. Related jobs are billing machine, adding machine, bookkeeping machine, calculating machine operators.

11. Transcriber-Machine Operator - (D.O.T. 208.588) - Transcribes letters, reports, and other recorded data. Uses transcribing machine and typewriter. Utilizes

knowledge of machines such as Audiograph, Dictaphone, Ediphone, Scribes, and Stenocord.

12. Receptionist - (D.O.T. 237.368) - Receives clients or customers coming into establishment. Ascertains their wants and directs them accordingly. Makes appointments.

13. Messenger - (D.O.T. 230.878) - Delivers messages, documents, packages, and other items to offices or departments within establishments or to other business concerns. For additional information, see COMMUNICATION AND MEDIA.

14. Timekeeper - (D.O.T. 219.388) - Keeps daily record of arrival and departure time of employees. May locate workers on job. Pays employees. Calculates time worked, wages and units produced.

15. Typist - (D.O.T. 209. series) - Does copy work from rough draft to typewritten material. Majority of duties require use of typewriter. This is one of the basic jobs in the job family area office.

16. Cashier - (D.O.T. 211.138) - Accepts money. Operates cash register. Possesses high degree of finger and eye dexterity. Displays tact. Answers telephone inquiries, restocks shelves, prices merchandise.

**BUSINESS
AND
OFFICE**

ACCOUNTING

This area is the science, art or system of keeping, analyzing and explaining records.

Manager
Cost Accountant
Certified Public Accountant
Systems Analyst
Statistician
Machine Accountant

COMPUTER

This area involves the electronic method of storing, calculating, correlating, and selecting data of a specific nature.

SECRETARIAL SCIENCE

This area is the specialization of keeping records, taking dictation, composing, editing and creative writing.

Legal Secretary
Stenographer
Court Reporter
Court Clerk
Medical Secretary

MANAGEMENT

This area is the coordination of planning, directing and controlling the activities of personnel.

PERSONNEL

This area involves the functions of recruiting, interviewing, hiring and record keeping during the working career of an individual.

Clerk
Counselor
Technician
Investigator
Administrative Assistant
Recruiter

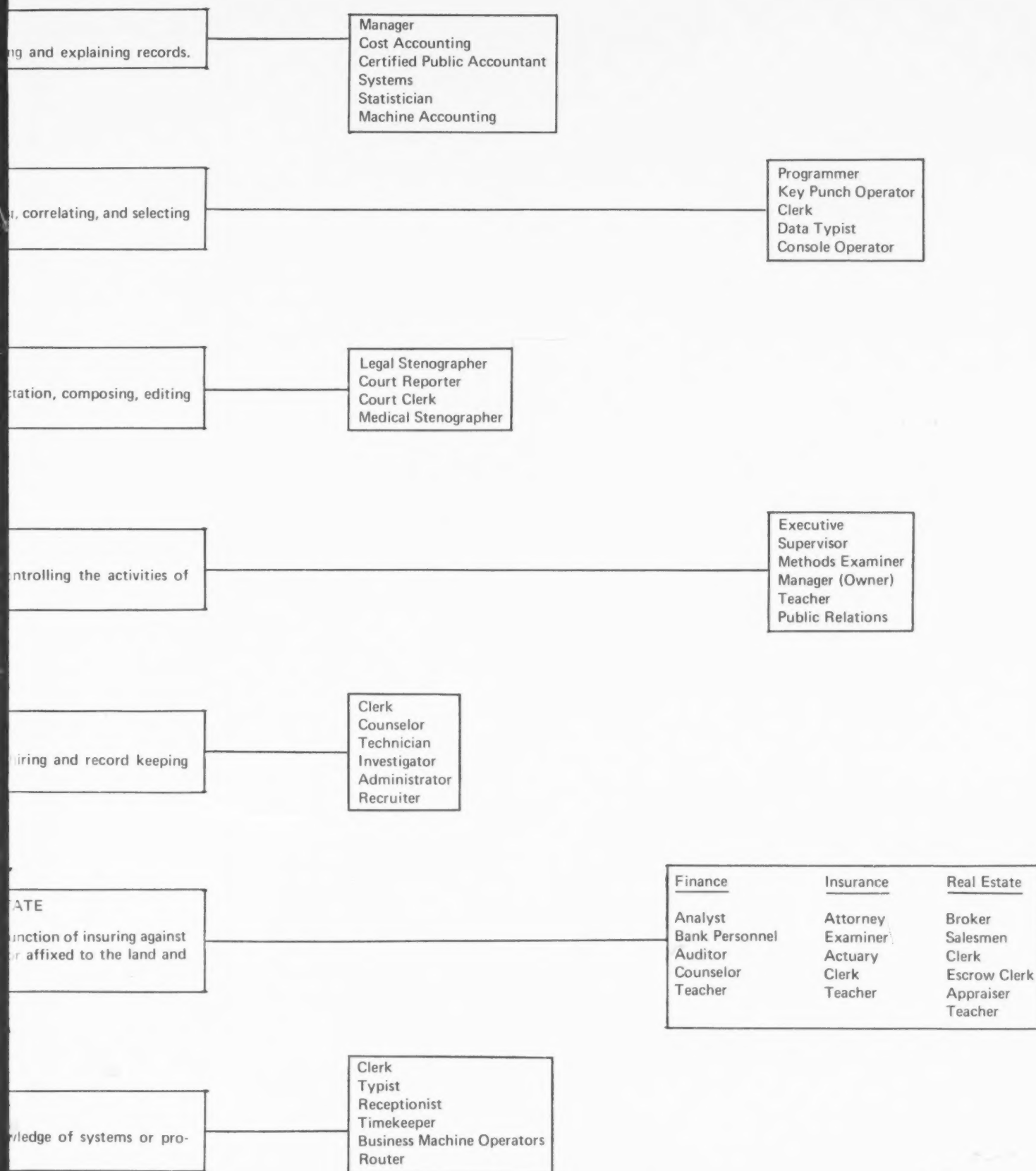
FINANCE – INSURANCE – REAL ESTATE

Finance is the science of managing money. Insurance is the function of insuring against loss. Real estate is the land, and what is erected, growing or affixed to the land and transactions involved in these functions.

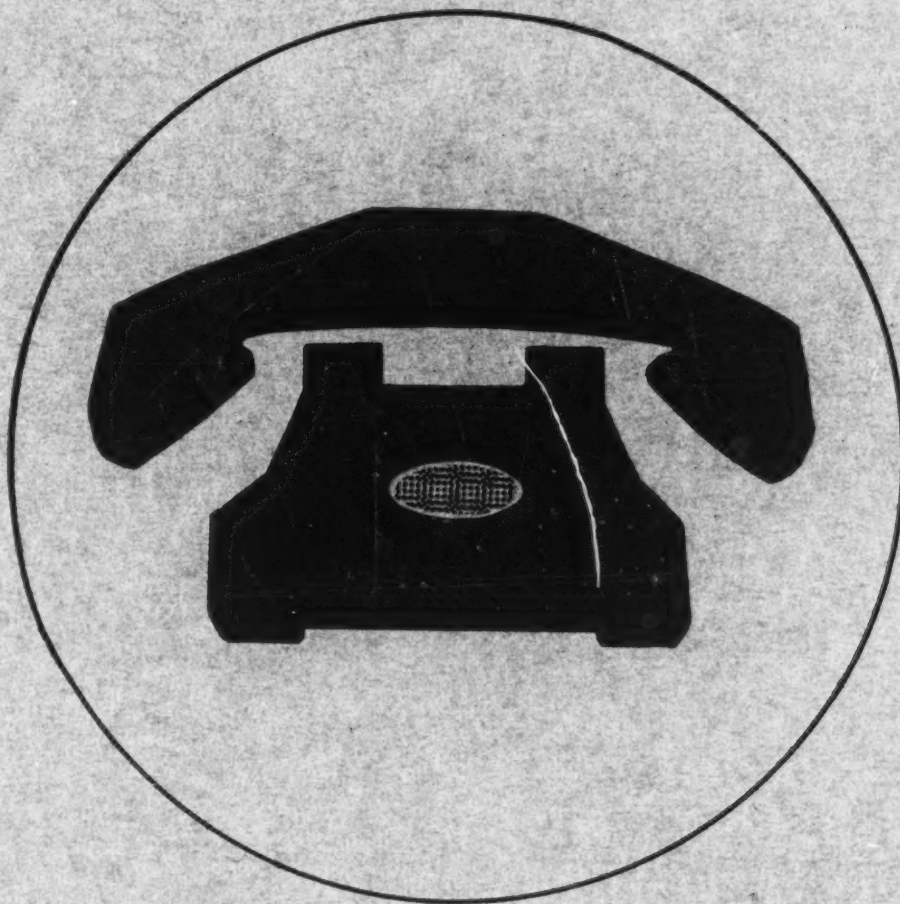
OFFICE (CLERICAL)

This area is the office and clerical duties not requiring knowledge of systems or procedures.

Clerk
Typist
Receptionist
Timekeeper
Business Manager
Router



COMMUNICATIONS AND MEDIA



PREPARED BY
ANN REEVES
GRAYSON COUNTY COLLEGE
SHERMAN/DENISON, TEXAS

COMMUNICATIONS AND MEDIA

I. INTRODUCTION

History records that from his most primitive beginnings, man has constantly and resolutely searched for new and better means of communicating with his fellowman. Cave paintings, beating a hollow log with a club, and smoke signals were employed by primitive man for communicative purposes. As man became more sophisticated, so too did his communication devices. This can be witnessed by such inventions as the printing press, the telegraph, and the telephone. The advent of radio and television ushered in a communication explosion which is progressively mushrooming as more advances in technology are made. Experimentation and beginning steps in the field of Satellite and Laser Transmission hold great promise for realizing the ultimate goal of all communication media--giving man the means of achieving a world community.

It is to be expected that many new jobs would be the result of such an explosion, and this is certainly the case. Most of the positions require some form of training or apprenticeship, but by no means is a college degree always the requisite for obtaining a job in any of the fields comprising the area of communications. The individual with ideas to express or who is desirous of expressing others' ideas can find no more challenging or rewarding work than in the area of COMMUNICATIONS AND MEDIA.

II. METHODOLOGY

Numerous books, pamphlets, and articles were given a cursory examination and then rejected when it was discovered that the most valuable assistance could be obtained from The Dictionary of Occupational Titles, The Occupational Outlook Handbook, and interviews with experts in various fields.

U.S. Department of Labor. Dictionary of Occupational Titles, Third Edition, Vols. I and II. U.S. Government Printing Office (Washington, D. C., 1965).

U.S. Department of Labor. Occupational Outlook Handbook, 1971/1972 Edition, U.S. Government Printing Office (Washington, D. C.).

Interview with Mr. Toby Arnold, executive with PAMS Recording Company, Dallas, Texas.

Interviews with several members of the Public Relations Department of Southwestern Bell Telephone Company, Dallas, Texas.

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS.

The individual Job Families, with a listing and discussion of the function of individual occupations, are listed below:

- A. Journalism
- B. Motion Pictures
- C. Telephone and Telegraph
- D. Recording Industry
- E. Radio and Television Broadcasting
- F. Satellite and Laser Transmission

A. JOURNALISM - In the burgeoning communications world, the field of journalism is rich with opportunities for those whose primary interests are writing and discussing the facts behind any situation. Newspapers, magazines, trade publications, radio and television news departments, and book publishers are prime sources of employment for the beginning journalist; each offers advancement for the talented and the ambitious. For those interested in the photographic or the business and advertising area allied to journalism, information relative to these can be found in the FINE ARTS AND HUMANITIES, THE BUSINESS AND OFFICE, and the MARKETING AND DISTRIBUTION pamphlets.

1. Reporters

a. General Assignments - (D.O.T. 132.268) - Collects and analyzes facts about newsworthy events by interview, investigation, or observation, and writes stories to prescribed editorial techniques and format.

b. Foreign Correspondent - (D.O.T. 132.268) - Reports stories, articles, and news items by mail, telephone, radio, or telegraph from locations distant from publication.

- c. Feature Reporter - (D.O.T. 132.268) - Writes stories of humorous, interpretative, narrative, or otherwise subjective character, usually with emphasis placed on writing style and personal viewpoint of the reporter.
- d. Rewrite Man - (D.O.T. 132.268) - Writes news copy for publication from written or telephone notes supplied by reporters.
- e. News Specialist, Syndicate - (D.O.T. 132.068) - Writes syndicated news articles for newspaper publications.

2. Copy and Proof Readers

- a. Copy Reader - (D.O.T. 132.288) - Edits and corrects newspaper or magazine copy. Writes headlines preparatory to printing.
- b. Braille Proofreader - (D.O.T. 209.688) - Compares proof copy of Braille transcriptions with original copy. Requires thorough knowledge of Braille.
- c. Proofreader - (D.O.T. 209.688) - Reads proof of type setup to detect and mark for correction of any grammatical, typographical, or compositional errors.

3. Columnists and Critics

- a. Columnist - (D.O.T. 132.068) - Writes feature column, appearing periodically in newspaper or magazine, based on personal observations and experience with subject matter. May specialize in areas such as sports, fashions, politics, society.
- b. Editorial Writer - (D.O.T. 132.088) - Writes comments on topics of current interest to stimulate or mold public opinion in accordance with viewpoints and policies of publication.
- c. Critic - (D.O.T. 132.088) - Writes critical reviews of literary or artistic works for newspapers or periodicals. May specialize in areas such as drama, movies, music.

4. Manuscript Analysts

- a. Book Critic - (D.O.T. 132.288) - Reads and evaluates book manuscripts to determine suitability for publication,

and reader appeal.

b. Reader, First - (D.O.T. 132.288) - Reads submitted magazine manuscripts to select those suited for publication on basis of literary merit and probable reader interest.

5. Specialized Personnel

a. Crossword Puzzle Maker - (D.O.T. 139.088) - Devises and creates crossword puzzles for publication.

b. Librarian - (D.O.T. 206.388) - Keeps file of news items, microfilm, and other material for use by editorial and reportorial staff.

c. Translator, Braille - (D.O.T. 209.588) - Transcribes reading matter into Braille on special paper, using a Braille code form and hand stylus or Braille typewriter to impress in the paper the Braille characters.

6. Editors

a. Editor, Managing, Newspaper - (D.O.T. 132.018) - Negotiates with newspaper owner's representative to establish publication policies, and directs editorial activities of newspaper departments.

b. Editor, Department - (D.O.T. 132.038) - Coordinates activities of publication's news or feature departments and supervises reporters engaged in gathering, writing, and publishing one specific type of news.

c. Editor, Trade or Technical Publication - (D.O.T. 132.038) - Selects, writes, and reviews materials for publication, plans layout, and supervises editorial staff of publication of a trade or technical nature.

d. Editor, Book - (D.O.T. 132.068) - Interviews authors, suggests changes in book manuscripts, and negotiates with authors regarding details of publication.

e. Editor, Magazine - (D.O.T. 139.088) - Formulates editorial policy of periodical and directs activities of editorial personnel in conformity with interests and tastes of readership.

f. Editor, Greeting Card - (D. O. T. 139.088) - Originates, selects, edits verses, and develops ideas for greeting cards.

7. Circulation and Distribution Personnel - See MARKETING AND DISTRIBUTION.

8. Advertising and Advertising Sales Personnel - See MARKETING AND DISTRIBUTION.

B. MOTION PICTURES - Frequently, students interested in the production of motion pictures are discouraged from entering the field for they believe it to be limited to "Hollywood." Actually, prospective film-makers can find employment with companies where films, filmstrips, and slides are produced for educational, industrial, business, and other purposes. Job descriptions delineated here are those concerned with "behind the camera" activities. For information relative to the field of acting, consult the FINE ARTS AND HUMANITIES pamphlet.

1. Producers and Directors

a. Producer - (D. O. T. 187.168) - Coordinates writers, directors, and editors. Establishes budget and engages key actors and production staff members.

b. Director - (D. O. T. 159.168) - Directs cast and crew members during rehearsals and filming. Distributes parts, explains desired interpretations, gives critiques, and suggests changes.

c. Director, Research - (D. O. T. 052.168) - Researches and then advises director concerning historical details of subject to be filmed.

d. Director, Art - (D. O. T. 149.031) - Directs and coordinates motion picture art work production concerned with set design, scenic effects, and costumes.

e. Director, Music - (D. O. T. 152.048) - Supervises personnel in studio music department and conducts studio orchestra.

f. Director, Casting - (D. O. T. 159.268) - Auditions and interviews performers for specific parts. Submits report to director for final selection.

g. Director, Cast - (D. O. T. 166.168) - Advises cast when to appear for filming of scenes. May act as a dialogue coach.

h. Director, Location - (D. O. T. 191.168) - Seeks out, then arranges for leasing of suitable property for use as a location site.

2. Writing Personnel

a. Editor, Scenario - (D. O. T. 131.038) - Supervises scenario and continuity writers engaged in writing stories, screen adaptations, and screen continuity.

b. Scenario Writer - (D. O. T. 131.088) - Writes stories, adaptations, or scenarios.

c. Continuity Writer - (D. O. T. 131.088) - Writes sequence of scenes in photoplays, arranging scenes to provide action continuity to series of events being portrayed.

d. Gag Writer - (D. O. T. 131.088) - Writes humorous dialogue, jokes.

e. Title Writer - (D. O. T. 131.088) - Writes captions, titles, and narrative after film is completed.

f. Reader - (D. O. T. 131.088) - Reads novels, stories, plays, and prepares synopsis for editorial department or producer.

g. Continuity Clerk - (D. O. T. 209.388) - Prepares type-written descriptive record of scenes, including dialogue and details such as wardrobe, hairdress, or scene entrances and exits of actors to aid in editing.

h. Script Clerk - (D. O. T. 969.368) - Keeps records of data relative to filming scenes and performs secretarial duties for director.

3. Special Artists

a. Background and Title Artist - (D. O. T. 141.081) - Draws, and paints titles and title background, and also letters the credits to be photographed. See FINE ARTS AND HUMANITIES.

- b. Cartoonist - (D. O. T. 141.081) - Draws cartoons in sequence to portray animation of characters, of wind, fire, rain, or of background layouts. See FINE ARTS AND HUMANITIES.
 - c. Color Advisor - (D. O. T. 141.081) - Advises cartoonist and animation photographers about color. See FINE ARTS AND HUMANITIES.
 - d. Inker and Opaquer - (D. O. T. 970.381) - Traces drawings of cartoonists and paints tracing to render them opaque. See FINE ARTS AND HUMANITIES.
 - e. Painter, Animated Cartoons - (D. O. T. 970.381) - Applies paint on celluloids to depict characters and background. See FINE ARTS AND HUMANITIES.
4. Camera, Lighting, and Sound Personnel
- a. Camera Clerk - (D. O. T. 223.387) - receives, stores, and issues camera equipment.
 - b. Cameraman, Animation - (D. O. T. 143.382) - Operates special cameras to make animated cartoons.
 - c. Cameraman, First and Second - (D. O. T. 143.062) - Directs camera work, informs electrician of lighting needs, determines type of equipment needed, sets up cameras, focuses, and operates power-driven camera to follow action.
 - d. Cameraman, Special Effects - (D. O. T. 143.382) - Photographs still and action scenes on miniature sets. When developed and incorporated in sequence, these create realistic images of action supposedly occurring.
 - e. Cameraman, Title - (D. O. T. 143.382) - Photographs title cards bearing foreign-language titles and written dialogue on film for export.
 - f. Dubbling Machine Operator - (D. O. T. 962.885) - Tends film dubbing machines that play back recordings to facilitate sound and picture synchronization.
 - g. Electrician, Chief - (D. O. T. 824.138) - Supervises and coordinates installation, maintenance, and operation of all electrical lighting equipment.

- h. Electrician, Studio - (D. O. T. 824.884) - Connects cables to power supply for lighting, photographic, and sound recording equipment.
- i. Machinist, Motion Picture Equipment - (D. O. T. 714.281) - Repairs and services mechanical parts of photographing, projecting, editing, sound recording, and power equipment.
- j. Microphone Boom Operator - (D. O. T. 962.884) - Moves boom according to script and position of performers.
- k. Motion Picture Narrator - (D. O. T. 150.148) - Makes explanatory comments to accompany action of motion picture.
- l. Motorman - (D. O. T. 962.884) - Connects camera and sound motors to power source and maintains, equipment during use.
- m. Operator, Lights - (D. O. T. 962.782) - Positions and operates overhead and floor lights during filming.
- n. Play Back Man - (D. O. T. 194.782) - Operates recording machine to reproduce master recordings of music, dialogue, or sound effects.
- o. Recordist - (D. O. T. 962.782) - Controls recording equipment of sound that originates on set.
- p. Re-recording Mixer - (D. O. T. 194.382) - Operates console to synchronize pre-recorded dialogue, music, and sound effects with film action.
- q. Set Electrician, Chief - (D. O. T. 962.131) - Supervises setting up, positioning, and operation of lights on set.
- r. Sound and Laboratory Engineer - (D. O. T. 976.281) - Establishes specifications for changing chemical solutions from standard formulas used in printing films.
- s. Sound Cutter - (D. O. T. 194.382) - Edits and synchronizes music, dialogue, and sound effects of film into single-sound print.
- t. Sound Mixer - (D. O. T. 194.282) - Operates console to regulate volume level and quality of sound during filming.

- u. Stage Man - (D. O. T. 962.887) - Places microphone on set preparatory to filming.
- v. Stand-By Grip - (D. O. T. 962.887) - Transports camera and other equipment to set. Moves camera during filming.
- w. Stand-In - (D. O. T. 961.868) - Substitutes for star while cameramen get angles, focus, set lights prior to filming.
- x. Transmission Man - (D. O. T. 962.884) - Establishes and maintains electric circuits necessary for transmission, recording, and reproduction of sound on set.

5. Film Processors, Editors, Librarians, Projectionists

- a. Bench Examiner - (D. O. T. 714.884) - Hand rewinds, film, brushes solution on film to strengthen splices and eliminate foreign noise.
- b. Chemical Mixer - (D. O. T. 976.884) - Mixes chemicals and liquids to prepare solution for processing exposed film.
- c. Densitometer Reader - (D. O. T. 926.387) - Determines photographic density of motion picture film.
- d. Developing Machine Operator - (D. O. T. 976.885) - Tends machine that develops exposed film.
- e. Editor, Film - (D. O. T. 926.288) - Edits film and sound tracks according to scenario and director's requirements.
- f. Film Drying Machine Operator - (D. O. T. 976.885) - Tends machine that dries developed film.
- g. Film Inspector I - (D. O. T. 969.687) - Inspects film prints for defects prior to shipment.
- h. Film Inspector II - (D. O. T. 962.885) - Tends electronic machine that automatically inspects, cleans, counts footage, and rewinds reels, and repairs film defects.
- i. Film Laboratory Equipment Mechanic - (D. O. T. 629.281) Builds and repairs processing machinery and tools.

- j. Film Loader - (D. O. T. 962.887) - Loads and unloads film in film magazines for use in camera.
- k. Film Numberer - (D. O. T. 652.885) - Tends film numbering machine that prints footage of rolls of negative film on edge of film to facilitate further processing.
- l. Film Printer - (D. O. T. 976.782) - Operates film printing machine whereby image on negative motion picture film is printed on positive film.
- m. Film Splicer - (D. O. T. 962.884) - Splices ends of film together to make a continuous reel.
- n. Film Viewer - (D. O. T. 969.688) - Compares positive films with reference prints to detect irregularities in detail and color.
- o. Foreign Title Breaker - (D. O. T. 962.884) - Cuts waste at beginning and end of foreign title film so that strips may be spliced in without altering film's footage.
- p. Librarian - (D. O. T. 223.387) - Keeps library of stock and processed films for future reference.
- q. Motion Picture Projectionist - (D. O. T. 960.382) - Sets up and operates projector and sound reproducing equipment.
- r. Negative Cutter - (D. O. T. 976.884) - Cuts and assembles negative film.
- s. Photographic Sensitometrist - (D. O. T. 976.381) - Determines characteristics of photographic emulsions in order to achieve desired results in processed film and prints.
- t. Replacement Girl - (D. O. T. 976.588) - Orders replacement of footage of defective negative film.
- u. Screen Examiner - (D. O. T. 960.382) - Projects and inspects film to detect defects in printing and developing.
- v. Sorter - (D. O. T. 223.687) - Prepares reels of film for shipment.

w. Timer - (D. O. T. 976.381) - Examines developed negative to determine time required for printing clear, sharp, positive prints.

x. Transferrer, Number - (D. O. T. 976.887) - Attaches identifying number stickers to exposed film to prepare it for further processing.

y. Vault Custodian - (D. O. T. 223.138) - Supervises receiving, identifying, storing, and issuing of films stored in vaults.

z. Waxer - (D. O. T. 690.885) - Tends machine that applies wax to sprocket holes in film to strengthen them and facilitate passage of film through projector.

6. Costume and Make-up Personnel

a. Costumer - (D. O. T. 969.261) - Designs and selects costumes for cast according to period style and characters to be portrayed. Fits Costumes.

b. Decoration Maker - (D. O. T. 784.884) - Makes decorations for hats and costumes with cloth.

c. Make-up Man - (D. O. T. 333.271) - Analyzes production requirements and applies make-up to alter actors' appearances in accord with their roles.

d. Shopper - (D. O. T. 962.158) - Shops for and arranges for purchase or rental of wearing apparel and accessories.

e. Stand By - (D. O. T. 346.878) - Arranges wearing apparel and checks personal effects of actors on set.

f. Supervisor, Costumes - (D. O. T. 969.138) - Supervises storage, altering, making, renting, and buying of costumes.

g. Supervisor, Make-up - (D. O. T. 332.138) - Supervises application of make-up and hairdressing.

h. Wardrobe Speciality Worker - (D. O. T. 346.381) - Makes, repairs, alters special wardrobe items.

7. Scenery, Property, and Special Effects Personnel

- a. Ager - (D. O. T. 962.884) - Paints and burns surfaces to make them look old, worn, charred.
- b. Prop Maker - (D. O. T. 969.281) - Fabricates props, minatures, and sets from various materials. Analyzes and works from designs and blueprints. Rigs and controls moving elements that depict action.
- c. Draper - (D. O. T. 962.781) - Cuts fabrics for drapes, banners, flags, bunting for sets, and hangs them.
- d. Greensman - (D. O. T. 962.884) - Plants trees, shrubs etc., on sets.
- e. Grip Boss - (D. O. T. 962.137) - Supervises and coordinates activities of crew engaged in moving stage sets and equipment to, from, and in studios and locations.
- f. Outside Property Man - (D. O. T. 962.158) - Locates and arranges for purchase or rental of any prop not in stock or to be built.
- g. Painter, Stage Settings - (D. O. T. 840.381) - Paints walls, furniture, etc., of sets.
- h. Property Custodian - (D. O. T. 223.387) - Receives, stores, and issues props in stock room.
- i. Prop Man - (D. O. T. 962.887) - Installs and removes set props such as rugs, lamps, furniture.
- j. Property Master - (D. O. T. 962.138) - Supervises obtaining, moving, and fabricating props.
- k. Set Decorator - (D. O. T. 142.061) - Coordinates decoration of sets.
- l. Special Effects Man - (D. O. T. 962.211) - Operates special effects equipment such as wind and fog machines.
- m. Stage Property Foreman - (D. O. T. 962.138) - Supervises dressing of set with props.
- n. Supervisor, Scenic Arts - (D. O. T. 149.031) - Supervises scenic artists in painting scenery and backdrops.

- o. Miniature Set Constructor - (D. O. T. 141.081) - Constructs miniature models according to scale.
- p. Miniature Set Designer - (D. O. T. 142.081) - Designs and draws scale drawings of miniature models.
- q. Stage Set Designer - (D. O. T. 142.081) - Designs and prepares scale drawings of set for use in set fabrication.
- r. Scenic Artist - (D. O. T. 144.081) - Paints scenery, backdrops of sets.
- s. Sketcher - (D. O. T. 142.081) - Plans, develops, prepares sketches of scenes and backgrounds against which action is shot.

C. TELEPHONE AND TELEGRAPH - Probably no communications and media area has known nor will continue to know such amazing growth as the telephone and telegraph industry. Employment opportunities in this field are many and varied, as this industry embraces occupations that are concerned with the installation, maintenance, and operation of local, long distance, and cable systems for wire and radio transmission of messages.

1. Engineers

- a. Cable Lay-Out Man - (D. O. T. 017.281) - Lays out cable runs for telephone and telegraph offices. Acts as consultant to building architect.
- b. Outside Plant Engineer - (D. O. T. 003.187) - Plans and prepares designs for handling of wire, cable, and conduit of radio/television and other communications facilities and equipment.
- c. Special Service Representative - (D. O. T. 003.151) - Acquaints and consults with business and industrial clients concerning the multiplicity of telephone services available.
- d. Telegraph Engineer - (D. O. T. 003.081) - Performs research and testing to develop systems or equipment. prepares diagrams and blueprints.
- e. Telephone Engineer - (D. O. T. 003.081) - Designs, plans, and oversees construction and operation of central and individual phone communications systems and facilities. May serve in a specialized area such as Equipment

Engineer, Line Construction Engineer, Telecommunications Service Engineer.

f. Transmission and Protection Engineer - (D. O. T. 003. 187) - Plans telephone transmitting facilities from engineering sketches. Provides engineering service for protection of telephone service and facilities.

2. Translators, Radio Communications - (D. O. T. 137.288) - Translates international radiograms into English upon reception or into a foreign language for transmission.

3. Administrators, Specialized

a. Manager, Customer Service - (D. O. T. 168.168) - Directs activities concerned with investigation and processing of claims for property damage or financial loss sustained as result of alleged telegraph service negligence.

b. Public Program Supervisor - (D. O. T. 165.068) - Promotes goodwill and interest in telephone services. Organizes programs and designs visual aids.

c. Regulatory Administrator - (D. O. T. 168.168) - Directs activities concerned with investigating complaints from telephone subscribers and Public Utility Commission.

4. Managers and Supervisors

a. Building Supplies and Motor Vehicle Supervisor - (D. O. T. 186.168) - Manages acquisition, construction and maintenance of telephone real properties, vehicles, supplies.

b. Manager, Telegraph Office - (D. O. T. 184-168) - Manages the personnel and supervises activities of the local office.

c. Manager, Traffic I - (D. O. T. 184.168) - Directs Directs message traffic operations in central telegraph office.

d. Manager, Traffic II - (D. O. T. 184.168) - Directs customer services of telephone traffic departments.

- e. Operations Manager - (D. O. T. 184.118) - Directs activities of main and branch offices of telegraph communications systems.
- f. Revenue Settlements Administrator - (D. O. T. 184.118) - Conducts and administers inter-company negotiations on revenue settlements.
- g. Superintendent, Communications - (D. O. T. 184.118) - Directs construction, operation, and maintenance of telephone and telegraph communications systems.
- h. Superintendent, Station - (D. O. T. 184.168) - Directs submarine cable station personnel and activities.
- i. Testing and Regulating Chief - (D. O. T. 184-168) - Directs testing and regulating department activities of telegraph office.
- j. Traffic Chief, Radio Communications - (D. O. T. 184.168) - Directs transmission of international radiograms over long-distance radio circuits.

5. Miscellaneous Technicians and Managers

- a. Photoradio Operator - (D. O. T. 193.382) - Operates telegraph equipment to send and receive radio photographs.
- b. Radiotelegraph Operator - (D. O. T. 193.282) - Operates and maintains radiotelegraph transmitters and receivers.
- c. Radiotelephone Operator - (D. O. T. 193.282) - Operates and maintains radiotelephone transmitters and receivers.
- d. Right of Way Supervisor - (D. O. T. 191.118) - Coordinates activities of right-of-way agents and contacts property owners and public officials to obtain permits and easements or to purchase right-of-way for lines.

6. Clerical and Sales Personnel - Operators are included in this category, and their job descriptions will be delineated here. For those jobs which are purely clerical or involved with sales, consult the BUSINESS AND OFFICE and the MARKETING AND DISTRIBUTION pamphlets.

- a. Multiplex Machine Operator - (D. O. T. 203.588) - Sends and receives messages via telegraphic typewriters.
 - b. Central Office Operator - (D. O. T. 235.862) - Operates telephone switchboard to establish or assist customers in establishing local or long distance telephone communications.
 - c. Information Operator - (D. O. T. 235.862) - Provides telephone information from central office switchboard.
 - d. Morse Operator - (D. O. T. 236.588) - Sends and receives messages in Morse code using manual or semi-automatic key.
 - e. Private Branch Exchange Service Advisor - (D. O. T. 235.228) - Conducts training classes in operation of switchboard and teletype equipment.
 - f. Service Observer - (D. O. T. 239.588) - Observes operator's and clerical personnel's demeanor, techniques, and observance of company policies.
 - g. Supervisor, Automatic Equipment - (D. O. T. 239.138) - Supervises activities of teletype operators and switching clerks.
 - h. Switching Clerk - (D. O. T. 235.585) - Tends switching equipment through which telegraph messages are received at the central office and then are routed to their destinations.
 - i. Telefax Clerk - (D. O. T. 236.382) - Operates telegraphic facsimile machine to send and receive messages.
 - j. Telegraph Messenger I, II - (D. O. T. 230.868, 230.368) - Delivers telegraph messages in person or by telephone.
7. Bench Worker, Electrical Equipment
- a. Assembler, Equipment - (D. O. T. 722.381) - Wires switchboards and similar telegraph apparatus in the telegraph office.
 - b. Bench Hand - (D. O. T. 706.884) - Performs a variety of bench and machine operations in the telephone research laboratory.

c. Instrument Shopman - (D. O. T. 722.881) - Repairs and modifies telephone and telegraph equipment.

3. Electrical Assembling, Installing, Repairing Personnel - Most job descriptions in this area may be found in the CONSTRUCTION pamphlet. However, those jobs which particularly pertain to the telephone and telegraph industry are described here.

a. Equipment Inspector - (D. O. T. 822.281) - Inspects layout and equipment of a telegraph office to determine extent of construction, replacement, or modification required to maintain or improve efficiency of installation.

b. Line Inspector - (D. O. T. 822.287) - Inspects lines and cables to determine needs to maintain communication efficiency.

c. Lineman - (D. O. T. 822.381) - Installs and repairs telephone and telegraph lines, both above and under ground.

d. Mechanician, Submarine - (D. O. T. 822.281) - Repairs and maintains machines and equipment in submarine cable office to control cable traffic.

e. Repairman, Foreman - (D. O. T. 822.131) - Superintends the installation and repair of private and public telephones, switchboards, and teletype machines.

f. Telephone Inspector - (D. O. T. 822.381) - Inspects plant equipment, poles, wires to see if installed properly.

g. Test Deskman - (D. O. T. 822.381) - Locates malfunctions in lines using switchboard composed of electrical testing apparatus.

h. Testing and Regulating Technician - (D. O. T. 822.281) - Tests and adjusts telegraph repeaters and terminal apparatus to maintain continuity of service.

i. Transmission Man - (D. O. T. 822.381) - Tests phone equipment in office that services lines between communities and connects broadcasts into phone circuits.

9. Production and Distribution Personnel

- a. Assignment Clerk - (D. O. T. 957.368) - Assigns line, cable, and central office facilities used in providing and maintaining telephone and telegraph services.
- b. Dispatcher - (D. O. T. 957.168) - Estimates and re-routes telegraph cable circuits to insure flow of messages.
- c. Facilityman - (D. O. T. 959.387) - Examines telephone field installations to determine if they can provide additional service.
- d. Pole Framer - (D. O. T. 959.884) - Prepares telephone and telegraph poles for erection.
- e. Powerman I - (D. O. T. 952.782) - Operates and maintains central office equipment such as motors and generators.
- f. Tree Trimmer - (D. O. T. 959.884) - Trims trees to clear communication lines right-of-way.

D. RECORDING INDUSTRY - Although the recording industry (tape and disc) has felt and responded to the impact of the communications boom, entry into the field is rather limited. However, if the talented, qualified, and highly motivated individual perseveres and gains employment in the industry, he will find himself in the upper one-third of income levels. Positions in the industry fall into four areas: Sales, Administration, Production, and Engineering. For descriptions of jobs in the Sales and Administration areas, consult the pamphlets on MARKETING AND DISTRIBUTION and BUSINESS AND OFFICE. It should be noted that although the jobs described here relate to staff personnel, there are quite lucrative openings for free-lance personnel in the production area.

- 1. Sales - Consult the pamphlet on MARKETING AND DISTRIBUTION.
- 2. Administration - Consult the pamphlet on BUSINESS AND OFFICE.
- 3. Production

- a. Musician, Instrumental - (D. O. T. 152.048) - Plays one or more musical instruments as a member of a musical group. Reads scores. May improvise or transpose music.

b. Singer - (D. O. T. 152.048) - Gives expression to harmony, melody, and rhythm or music by means of human voice. Reads scores. May improvise or transpose music.

c. Composer - (D. O. T. 152.088) - Creates and writes musical compositions. Invents melodic, harmonic, and rhythmic structures.

d. Lyricist - (D. O. T. 130.088) - Writes words to be sung to accompaniment of music.

e. Arranger - (D. O. T. 152.088) - Transcribes musical compositions to create a particular style for orchestra, band, choral group or individual.

f. Artist and Repertoire Man - (D. O. T. 159.168) - Selects recording artists and musical selections for production of records, according to familiarity with popular tastes in music and knowledge of vocal and instrumental techniques, attempting to select most appropriate artist for each recording.

g. Director, Music - (D. O. T. 152.048) - Supervises personnel in studio music department. Formulates job assignments and schedules.

h. Producer - Responsible for quality of production. Must be an expert musician. Oversees all phases of production.

4. Engineer

a. Maintenance Engineer - (D. O. T. 950.782) - Maintains and repairs all recording equipment.

b. Chief Engineer - Responsible for and manages duties of entire engineering staff.

c. Mixing Engineer - Operates machine which may record from one to sixteen tracks, then operates console which mixes the separate recorded tracks to create one balanced master sound track.

d. Dubbing and Editing Engineer - Operates machines which dub in and edit sound on recorded tracks.

E. RADIO AND TELEVISION BROADCASTING

There is no doubt of the impact which the Radio and Television industry has had upon the viewing public, but it has also had a profound effect in the area of creating many new jobs. This industry embraces those occupations concerned with creating and broadcasting local, national, and international aural and visual programs. For the student interested in this field, there is a great diversity of occupations.

1. Broadcast Preparation Personnel

- a. Copyright Expert - (D. O. T. 963.288) - Examines script of radio and television musical programs to be broadcast to ascertain that permission has been secured for use of copyrighted materials.
- b. Costumer - (D. O. T. 969.261) - See Motion Pictures section of this pamphlet for description.
- c. Director - (D. O. T. 159.168) - See Motion Pictures section for description. May be designated according to type of production as Director, Radio; Director, Television; Director, Casting (D. O. T. 159.268); Director, Music (D. O. T. 152.048).
- d. Director, Music, International Broadcast - (D. O. T. 152.048) - Supervises personnel in studio music department and plans musical programs for broadcast to foreign countries, using knowledge of foreign languages and tastes of listeners to create programs of appeal.
- e. Director, Program I - (D. O. T. 184.168) - Plans programming for radio or television stations or network. Determines type, length, and time of each program, including commercial announcements and newscasts as well as entertainment. Title may derive from production area as Director, Broadcast; Director, International Programs; Production Chief; Production, Chief, International Broadcast.
- f. Director, Program II - (D. O. T. 159.168) - Directs cast in rehearsals and broadcasts of radio programs. If directing for international broadcasts, may be designated Production Man, International Broadcasting.
- g. Director, Public Service - (D. O. T. 184.168) - Plans,

schedules, and coordinates broadcasting of public service radio or television programs in various fields, such as education, religion, civic and government affairs.

- h. Editor, Continuity and Script - (D. O. T. 131.038) - Supervises writers preparing program continuity and scripts for broadcasting, and edits material to insure conformance with company policy, laws, and regulations.
- i. Editor, News - (D. O. T. 131.038) - Supervises correspondents, edits and rewrites news items. If involved with special events and public affairs as well, may be designated as Manager of News, Special Events, Public Affairs. (D. O. T. 131.038).
- j. Manager, Copyright - (D. O. T. 169.168) - Coordinates activities of personnel engaged in examining copyrights of musical and literary materials used for radio and television programs.
- k. Manager, Sound Effects - (D. O. T. 194.168) - Supervises and coordinates preparation and production of sound effects.
- l. Musical Program Director - (D. O. T. 152.168) - Selects and arranges program of music to meet time and content requirements for specified broadcast.
- m. Music Librarian - (D. O. T. 100.388) - Classifies and files musical recordings, sheet music, original arrangements, and scores for individual instruments. Selects music for specific subject matter, visual, or spoken action. If concerned with international broadcast, may be designated Music Librarian, International Broadcast.
- n. Producer I (D. O. T. 159.118) - Plans and coordinates various aspects of radio and television programs, namely script preparation, procurement of scenery, props, costumes, coordination of audio, video, music, and timing. May be designated Producer-Director I, Radio Producer, Television Producer.
- o. Production Man - (D. O. T. 963.168) - Aids in staging rehearsals and presenting television programs. Oversees distribution of studio facilities according to stage floor plan.

- p. Property Handler - (D. O. T. 962.887) - Performs manual work concerned with handling of stage props and scenery in and around radio and television studios.
- q. Screen Reporter - (D. O. T. 143.062) - Operates motion picture camera to photograph newsworthy events and subjects.
- r. Script Assistant - (D. O. T. 963.368) - Verifies placement of props and scenery prior to broadcast. Prompts actors from script during rehearsal and broadcast.
- s. Script Reader - (D. O. T. 963.288) - Reads script of radio and television programs to detect and recommend deletion of vulgar, immoral, libelous, or misleading statements.
- t. Script Writer - (D. O. T. 131.088) - Originates theme and dialog for sketches and plays for radio and television programs. If writing in a foreign language for international broadcast, may be designated Script Writer, International Broadcast.
- u. Sound Effects Man - (D. O. T. 194.281) - Produces sounds by artificial means which, when transmitted and synchronized with program being presented, convey to listener an aural impression of action being broadcast.
- v. Special Events Man - (D. O. T. 963.169) - Stages broadcasts of special events of unusual news interest, such as political conventions, inaugurations, parades.
- w. Supervising Film Editor - (D. O. T. 962.138) - Supervises and coordinates editing and assembly of filmed scenes. May be designated Editor of Film and News Reel when directing editing and assembly of news reels.
- x. Television Film Field Coordinator - (D. O. T. 143.168) - Plans, directs, and edits photography taken outside studio for television film shows.
- y. Writer-Announcer, Bilingual, International Broadcast (D. O. T. 159.148) - Translates scripts written in English into foreign language and reads script over the air.
- z. Writer, News, International Broadcast - (D. O. T. 131.068) -

Prepares news scripts for foreign broadcast, using knowledge of foreign languages and of the tastes of foreign people to arouse and maintain listening interest. If involved in writing scripts as well, may be designated as Writer of News or Script, Foreign Language. (D. O. T. 131.088).

2. Broadcast Presentation Personnel

a. Announcer - (D. O. T. 159.148) - Introduces programs, identifies stations, interviews guests, describes public events. May be designated according to area of work as Radio Announcer; Television Announcer; Disk Jockey; Sports Announcer; Announcer, International Broadcast.

b. Audio Operator - (D. O. T. 957.282) - Controls audio equipment to regulate volume level and quality of sound during television broadcasts.

c. Broadcast Checker - (D. O. T. 249.688) - Monitors radio and television programs to detect contractual violations.

d. Cameraman - (D. O. T. 143.062) - Operates television camera to photograph scenes for broadcast.

e. Continuity Writer - (D. O. T. 131.088) - Creates and prepares material that is read by announcer to introduce and connect various parts of a program.

f. Control Room Man - (D. O. T. 957.382) - Controls panel board to route radio programs originating in studios of network central stations and at various pick-up points, through switch-bank desk and over transmission lines.

g. Control Room Technician - (D. O. T. 957.282) - Controls and maintains control room equipment in television broadcasting studio.

h. Control Room Technician Supervisor - (D. O. T. 957.138) - Supervises technicians in operation, maintenance, and installation of equipment in a television control room.

i. Control Supervisor - (D. O. T. 193.168) - Coordinates activities of control room personnel in transmitting radio and television broadcasts according to program schedule.

- j. Director, Sports - (D. O. T. 184.168) - Coordinates activities of radio or television sports department and participates in sports program broadcast.
- k. Director, Technical - (D. O. T. 963.168) - Coordinates activities of radio or television studio and control room personnel to insure technical quality of pictures and sound for programs originating in studio or from remote pick-up points.
- l. Gag Writer - (D. O. T. 131.088) - Consult the Motion Pictures section of this pamphlet.
- m. Light Technician - (D. O. T. 962.381) - Positions and operates lighting equipment for television broadcast.
- n. Master Control Engineer - (D. O. T. 957.282) - Controls equipment to route television programs to transmitter and network lines for local broadcast and distribution to affiliated stations as indicated by daily program schedules.
- o. Microphone Operator - (D. O. T. 961.782) - Positions microphones and controls audio portions of radio and television broadcasts to maintain quality and volume of sound.
- p. News Analyst, Broadcast - (D. O. T. 131.068) - Analyzes, interprets, and broadcasts news received from various sources.
- q. Recording Machine Operator - (D. O. T. 194.782) - Operates disk, wire, tape, or videotape recording machines.
- r. Sound Mixer - (D. O. T. 194.282) - Consult the Motion Pictures section of this pamphlet.
- s. Telecine Operator - (D. O. T. 957.382) - Controls equipment, such as playback units and film projectors in television studio, synchronizing equipment with program content and activities of other technical personnel.
- t. Teleprompter Operator - (D. O. T. 963.382) - Types program copy for use in teleprompter and operates teleprompter during rehearsal and broadcast.
- u. Video Operator - (D. O. T. 957.282) - Controls video console to regulate transmission of television scenes.

v. Video Recording Engineer - (D. O. T. 963.382) - Controls equipment to photograph television images from video screen, record sound of broadcast, and develop and edit film for rebroadcast.

3. Transmission Personnel

a. Commercial Engineer - (D. O. T. 003.187) - Plans use of wire facilities connecting stations comprising a network to cover changing conditions and requirements.

b. Field Engineer - (D. O. T. 193.282) - Consult the CONSTRUCTION pamphlet.

c. Field Supervisor - (D. O. T. 193.168) - Consult the CONSTRUCTION pamphlet.

d. Power Plant Attendant - (D. O. T. 952.782) - Consult the CONSTRUCTION pamphlet.

e. Program Transmission Supervisor - (D. O. T. 957.388) - Compiles records of radio and television programs transmitted over network. May be designated Traffic Supervisor.

f. Radio Engineer - (D. O. T. 003.187) - Operates and maintains station audio and video transmission equipment in compliance with federal regulations.

g. Rigger - (D. O. T. 823.281) - Consult the CONSTRUCTION pamphlet.

h. Rigger Foreman - (D. O. T. 823.138) - Consult the CONSTRUCTION pamphlet.

i. Television Cable Lineman - (D. O. T. 822.381) - Consult the CONSTRUCTION pamphlet.

j. Transmission Engineer - (D. O. T. 003.187) - Maintains technical standards of broadcasting equipment by conducting tests, planning maintenance, and testing new or modified equipment and techniques.

k. Transmitter Operator - (D. O. T. 957.282) - Operates and maintains radio transmitter to broadcast radio and television programs.

4. Administration and Sales Personnel

- a. Director, Operations - (D. O. T. 184.168) - Coordinates activities of various radio and television broadcasting departments with respect to policy decisions, budget, and personnel.
- b. Director, Operations, Broadcast - (D. O. T. 184.168) - Coordinates preparation of network program schedules.
- c. Manager, Station - (D. O. T. 184.118) - Manages a radio or television station. Supervises sales, programs, engineering, and personnel. If in the area of international broadcasting, may be designated Director, International Broadcasting.
- d. Manager, Traffic - (D. O. T. 184.168) - Arranges for leasing of wire facilities to transmit radio and television programs to individual stations of a network.
- e. Salesman, Radio and Television Time - (D. O. T. 253.358) - Consult the MARKETING AND DISTRIBUTION pamphlet.
- f. Station Relations Contact Representative - (D. O. T. 184.168) - Coordinates activities involved in program presentations between network and independently owned radio and television stations comprising network.
- g. Television Schedule Coordination - (D. O. T. 199.388) - Prepares daily operation schedules and advance program log for newspaper, magazines, and traffic department.

5. Service Personnel

- a. Radio Repairman - (D. O. T. 720.281) - Repairs radio receivers and other electronic-audio equipment, using circuit diagrams and test meters.
 - b. Television Installation Man - (D. O. T. 823.781) - Installs and adjusts television receivers and antennas.
 - c. Television Service and Repairman - (D. O. T. 720.281) - Repairs and adjusts radios and television receivers, using hand tools and electronic testing instruments.
6. Supportive Personnel - Individuals, such as Actors, Musicians, Dancers, Comics, Specialized Commentators,

and others who perform on camera, will be found in the FINE ARTS AND HUMANITIES pamphlet.

F. SATELLITE AND LASER TRANSMISSION

We are familiar with the transmission of television pictures and telephone messages via satellite, but the ultimate potential for satellite and laser transmission is an unknown factor. Experimentation is constantly increasing our knowledge in the field, but this form of transmission is still an infant as far as other means of communication are concerned. "Consequently, outside of basic research, occupations are yet to be established in satellite and laser communications," stated an official with the Bell Telephone System.

The preceeding statement is not meant to discourage the interested individual from entering the field, but to acquaint him with present limitations. It is necessary to reiterate the great potential of the field, especially considering the fact that numerous private industries, besides the Bell Telephone System, are conducting experiments and plan to enter the field of satellite and laser transmission. At present, those occupations most utilized are Physicists and Electrical Engineers whose job descriptions may be found in the PUBLIC SERVICE and the CONSTRUCTION pamphlets.

COMMUNICATIONS
AND
MEDIA

JOURNALISM

Concerns those occupations involved in the writing and editing of newspapers, magazines, and books.

Rep
Copy
Colu
Man
Spec
Edit
Circu
Adve

MOTION PICTURES

Concerns those occupations involved in the creation and production of motion pictures.

TELEPHONE AND TELEGRAPH

Concerns those occupations involved in the transmission of messages via wire and radio for both local and long distances.

Engi
Trans
Adm
Man
Tech
Cler
Bene
Elec
Prod

RECORDING INDUSTRY

Concerns those occupations involved in the creation and production of recorded sound.

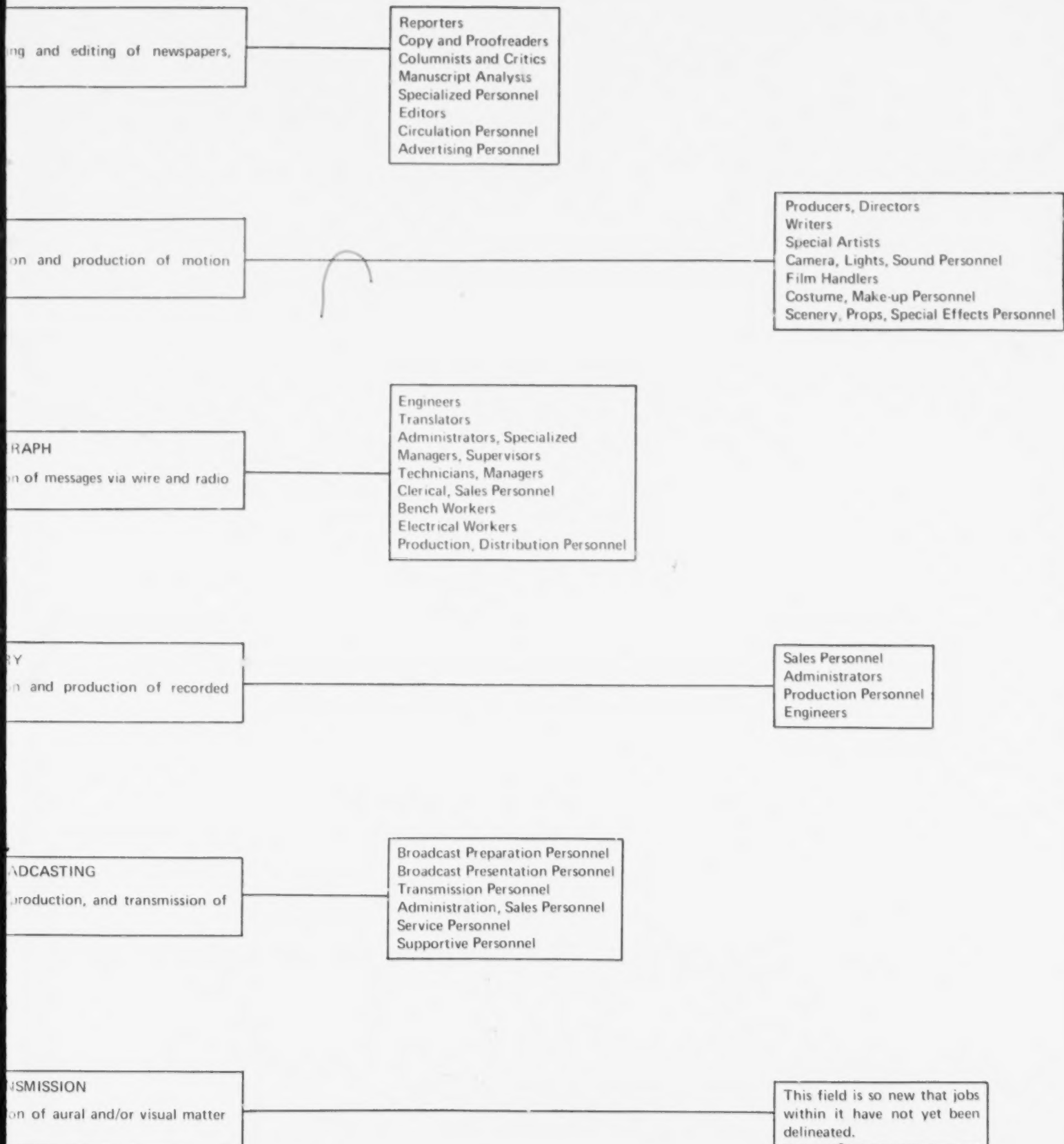
RADIO AND TELEVISION BROADCASTING

Concerns those occupations involved in the creation, production, and transmission of radio and/or television broadcasts.

Broad
Broad
Trans
Adm
Serv
Supp

SATELLITE AND LAZER TRANSMISSION

Concerns those occupations involved in the transmission of aural and/or visual matter via satellite or lazer.



CONSTRUCTION



PREPARED BY
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GRAYSON COUNTY COLLEGE
SHERMAN/DENISON, TEXAS

CONSTRUCTION

I. INTRODUCTION

The information accumulated in this Construction Careers Cluster is not intended, in any manner or form, to present you with a complete or total picture of the potential employment possibilities of the industry. The listings of job titles and job descriptions in this booklet are aimed at the individual who has little or no exposure to construction career information. The career, planner, or student should, upon conclusion of reading this booklet, have enough information to make an informed comparison of construction with the fourteen other career clusters. If the decision is made to pursue construction, there is enough information to attain a general indication of the academic or manual skills required for a particular job. Later in this booklet, you will find a listing of written materials and names of organizations and individuals as information sources to provide you with complete information concerning any particular job or area.

It is assumed that you do have some active interest in construction as a career, upon leaving or completing your formal education. Your entry into this field can take place at virtually any level of education, but today you will have to travel far and wide before you will find anyone who will advise you to drop out of high school. If you do drop out, you may have created for yourself a problem which does not have a ready solution.

If you decide on one of the technical areas such as Civil Engineering, Architecture, Surveying, etc., you should recognize that a college degree is the first stepping stone toward that goal. For complete details concerning a technical career, you should visit with someone who is presently in that type of work or write to several colleges or universities and ask for their information. You will be surprised how willing they are to help.

If you feel that a non-technical career is what you want, there are several routes for you to consider. If your school offers any of the programs aimed toward a skill or trade, give them full consideration. You can investigate the so-called "Trade Schools," junior colleges, or other college programs. In this state you will find a wide range of

training programs designed for your capabilities and interests. Many of these training programs are taught at institutes or junior colleges, but do not get the idea you will be placed in classes where academic or scholastic achievement is your only goal. These programs are designed to help you develop a skill or trade. If you still have not found what you want, then you can serve an apprenticeship in one of the recognized trades such as carpentering, plumbing, cement masonry, iron working, etc. These programs are actually conducted by the labor trades themselves. You will work with and under the direction of a journeyman on the construction site and attend classes in the evening. There always exists the possibility that you might acquire the necessary permits and licenses by passing tests given by local or state officials and declaring yourself in business in whatever area of construction you are capable of handling. If none of these routes provide you the information or guidance you need, then spend your summers working on different types of construction so you can get first-hand the things you are looking for.

II. METHODOLOGY

The following individuals have made contributions to the preparation of this booklet:

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Mr. Herman Gerneth
Secretary and Business Manager
Sherman Building Trades Council
Sherman, Texas

Mr. R. W. Young
Director of Texas Manufacturers Association
Dallas, Texas

Mr. G. R. Adams
 Iron Workers Union
 Dallas, Texas

The following publications were used as information sources for this booklet and were examined for various attitudes and approaches to construction. In 1965 the U. S. Department of Labor, in Washington, D. C. published two volumes of The Dictionary of Occupational Titles; in 1970, they also presented Toward the Ideal Journeyman in five volumes. 1971 was a productive year in that both the Occupational Outlook Handbook (an annual publication) and Building and Construction Trades were published. These federal publications plus two regional ones--Careers in the Crafts, published by the Dallas Building Trades Apprentice Program, and Apprenticeship - A Handbook, published by the Southern States Apprenticeship Conference--were of infinite aid in researching the field of CONSTRUCTION.

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual Job Families, with a listing and discussion of the function of individual occupations, are listed below:

A. WOOD CONSTRUCTION - Due to the workability and versatility of wood and wood products, you will find carpenters and associated workers on the job site from the time ground is broken until painters and decorators move out so the tenant can move in. Carpenters set shoring in tunnels, trenches, and open excavations. They build and install wooden forms to contain fluid concrete. They erect scaffolding to provide working access above the ground level. They erect wooden structures using heavy materials that form foundations, floors, walls, partitions, and roofs. They install roofing and siding materials. They install windows and door units, interior wall coverings, trim and molding. They fabricate and install cabinets, counters, fixtures, and furniture. After the structure is completed, carpenters maintain, repair and re-model. When the structure is no longer useful and is demolished, you will find carpenters in the wrecking crew.

The major area of employment in the wood crafts is with construction contractors. Many workers are self-employed in specialized areas which suit their abilities and interests. Business concerns involved in all sorts of industries have jobs which require carpenters.

It is generally agreed by all training authorities that the Carpenter trade is best learned by serving a four-year apprenticeship under the guidance of Journeyman Carpenters on the job site and backed up by related courses in the classroom. Many individuals with outstanding

aptitude for this type work can shorten the time of apprenticeship by demonstrating their abilities on the job and passing certified tests given by Journeymen in an organization. Others may work in such a specialized area that they can open their own company or business and not have to depend upon formalized and certified training for journeyman recognition.

It is quite obvious that many of the woodcraft job titles and work tasks overlap many times. The area of the country and tradition sometimes play an important part in the complete definition of what a particular worker will perform. The following is a general presentation of what you may expect of some of the more common job classifications.

1. Carpenter Foreman - (D. O. T 860.131) - Supervises and coordinates activities of workers engaged in construction, installation, and repair of wooden structures and fixtures. Examines blueprints, lays out, selects materials, determines sequence of activities, assigns workers, inspects work performed by subcontractors. May make cost and time estimates. Usually employed by a contractor or establishment and is in direct contact with workers on construction site. Requires great deal of experience in the particular type of construction he is involved in. Generally has spent quite some time as a worker actually performing tasks required and has the ability to supervise people. Depending on type of construction, may be in charge of large numbers of people and many dollars' worth of material and equipment. May be working or non-working, depending upon company policy.
2. Cofferdam-Construction Foreman - (D. O. T. 860.131) - Has direct contact with carpenters actually involved in construction of cofferdam in area of dam site. Works from blueprints to determine materials, equipment, job assignments, and any other coordination necessary to assure proper sequencing of operations. Usually has charge of pile-driving and shoring. Must have considerable experience and knowledge of blueprints, materials, methods and be able to handle people.
3. Form-Building Foreman - (D. O. T. 860.131) - Supervises carpenters and expediting of materials required for construction of wooden forms to mold concrete. May work in shop or directly on job site. Requires vast experience in material characteristics and methods of assembly. Must be able to read blueprints and have enough imagination to be able to instruct carpenters how to construct forms. May lay out with rule, tape, plumb, level, and transit.

4. Timbering Foreman - (D. O. T. 860.131) - Supervises and coordinates activities of rough carpenters engaged in construction or installation of structures or shoring with heavy planks or posts (timbers). May be in charge of workers driving piling or doing shoring activities. Requires knowledge of pile driving equipment and mechanical properties of material. Usually has considerable experience on heavy construction involving earth moving and concrete.

5. Carpenter-Labor Foreman - (D. O. T. 860.131) - Supervises and coordinates activities of workers engaged in supplying materials to workers who construct, erect, install and repair wooden structures and fixtures. Directs work crew to strip forms and dismantle wooden structures. Supervises workers engaged in pouring concrete. Usually employed by contractor or establishment large enough to warrant a foreman for carpenters and another for laborers. Usually reads blueprints to determine proper sequencing of worker and material operations.

6. Carpenter-Construction - (D. O. T. 860.381) - Constructs, erects, installs, and repairs wooden structures and fixtures. Highly knowledgeable and skilled in use of hand and power tools. May perform work in shop or on construction site. Studies blueprints, sketches, or building plans and follows verbal instructions to carry out the necessary operations. Usually specializes in some particular type of construction. May be self-employed but usually employed by contractor or establishment. May work as member of crew or individually. Selects lumber and other materials, prepares layout, marks cutting and assembly lines on materials, shapes materials to prescribed measurements. Assembles cut and shaped materials, verifies trueness of structure, erects framework for structures. Constructs concrete forms, erects scaffolding, and may weld metal parts to steel members. May be designated according to construction specialization.

7. Carpenter, Maintenance - (D. O. T. 860.281) - Constructs and repairs structural woodwork and equipment in an establishment, or as self-employed, working from blueprints, drawings or verbal instructions. Builds, repairs, and installs counters, cabinets, benches, partitions, floors, doors, building framework, and trim. Replaces ceiling tile, floor tile, and sheet plastic wall coverings, window shades, or Venetian blinds. Uses hand tools and power tools required. Work is usually neat and well done. Depending on the type of work being done, may become involved in repair jobs which require skills of other trades such as glazing or painting.

8. Carpenter, Hotel - (D. O. T. 860.131) - Repairs fixtures, doors,

windows, elevators, ceilings, floors, and remodels as required. Work must be high quality and neat appearing. May become involved in some heavy structural work but usually repairs broken or worn pieces.

9. Carpenter, Mill - (D.O.T. 860.131) - Works from blueprints, sketches, or verbal instructions to select materials, construct, and install cabinets, counters, decorative store fronts, and furniture. Usually works in a shop and sets up and operates a variety of wood-working machines to surface, cut, and shape lumber, and to fabricate parts for wood products, such as doors, door and window frames. Many are self-employed and others work for contractors or establishments. May make cost and time estimates required for contract bidding.
10. Carpenter, House - (D.O.T. 860.131) - Constructs and sets forms for foundation, builds structural skeleton, sheetrocks, decks, lays shingles, lays flooring, sometimes builds cabinets, and does decorative woodwork inside and outside. Works primarily with hand tools and some power tools in order to shape materials to required sizes. May be self-employed or be employed by contractor. Sometimes specializes in a particular phase of house construction such as Framing Carpenter, Sheetrocker, or Shingle Layer.
11. Carpenter, Mine - (D.O.T. 860.131) - See Carpenter, Rough.
12. Carpenter, Office Building - (D.O.T. 860.131) - See Carpenter Maintenance.
13. Carpenter, Plant - (D.O.T. 860.131) - See Carpenter, Finish and Carpenter, Maintenance.
14. Carpenter, Refrigerator - (D.O.T. 860.131) - Performs carpentry in construction of walk-in freezers and environmental test chambers. Installs forms for foundation requirements of machinery. Usually self-employed or employed by firm whose only business is highly specialized. Uses hand and power tools to shape various materials.
15. Carpenter, Finish - (D.O.T. 860.131) - Installs molding and sets trim. Panels walls and partitions. May lay out and construct cabinets, counters, and decorative wooden structures. Workmanship must be of high quality. Hangs prefabricated door and window units, sets locks, installs weather stripping. May specialize in one or more types of construction such as Door Hanger, Garage-Door Hanger, Hardwood-Floor Layer, Jalousie Installer, or Stair Builder.

16. Carpenter, Bridge - (D.O.T. 860.381) - Constructs, erects, installs, and repairs bridges, trestles, and tunnel supports. For further information, see TRANSPORTATION.
17. Carpenter, Acoustical - (D.O.T. 860.131) - Mounts acoustical tile to walls and ceilings of residential and commercial buildings. Installs metal tile lathing.
18. Carpenter, Building-Insulating - (D.O.T. 860.131) - Removes sections of walls, roofs, and floors, or cuts apertures in structures to facilitate installation of insulating materials.
19. Carpenter, Form Builder - (D.O.T. 860.781) - Works in shop or on construction site constructing wooden forms for molding concrete. Studies blueprints or follows verbal instructions to determine size and shape of forms. Uses hand tools and power tools.
20. Carpenter, Form Setter - (D.O.T. 860.781) - Installs forms on construction site and provides necessary supports and braces so forms will not shift when concrete is poured.
21. Carpenter, Rough - (D.O.T. 860.781) - Builds rough wooden structures, such as concrete forms, scaffolds, tunnel and sewer supports and temporary frame shelters, according to sketches or verbal instructions.
22. Carpenter, Packing - (D.O.T. 920.884) - Fabricates wooden crates or boxes using woodworking hand tools and power tools, and packs machinery, vehicles, or other large or odd shaped products. Reads blueprints, shipping notices, and other specifications, and inspects product to determine size and shape of container.
23. Carpenter, Shorer - (D.O.T. 860.884) - Erects timbers, cross braces, and sheeting for temporary retaining walls to support side-walls of trenches and open excavations.
24. Adzman, Pile Trimmer and Capping - See Laborer - Pile Driving, Ground Work (No. 34).
25. Asbestos - Shingle Roofer - Measures, cuts, and nails into place asbestos siding products.
26. Axman - Pile Trimming and Capping - See Laborer - Pile Driving, Ground Work (No. 34).
27. Band-Saw Operator - (D.O.T. 667.885) - Tends bandsaw that cuts wooden stock. Stacks pieces of stock on cutting table against

preset ripping fence. Pushes cutting table against saw until stock is severed.

28. Band-Scroll-Saw Operator - (D. O. T. 667.782) - Operates band-saw to saw curved or irregular designs on wooden stock. Installs jigs and attachments to rip stock to size.

29. Batterboard Setter - (D. O. T. 851.884) - Positions batterboards (horizontal boards used in construction to indicate desired levels and for attaching string to mark grades) to indicate direction of cut of power shovel or trenching machine. Determines height of batterboard from engineering data. May signal equipment operator to correct discrepancies.

30. Cribber - See Carpenter, Shorer.

31. Cribbing, Setter - See Carpenter, Shorer.

32. Laborer, Carpentry - (D. O. T. 860.887) - Assists Carpenter to build wooden structures. Selects and saws lumber to specified size. Holds lumber in position for nailing by carpenter. Nails sheeting to studs after structure has been framed. Cleans used lumber and wooden and metal forms. Removes shoring and bracing from forms, and dismantles and stacks them. Oils metal forms. Conveys materials and tools about job site.

33. Carpenter Helper, Hardwood Flooring - (D. O. T. 860.781) - Assists in laying hardwood flooring on subfloor surface.

34. Laborer, Pile Driving, Ground Work - (D. O. T. 850.887) - Assists Pile Driving Leadsman to erect piles and sheet piling for use in building structural foundations, retaining walls, and cofferdams. Cleans piling, using shovel or ax. Trims and points wooden piles or sheeting and tapers butt of wooden piles to fit piledriver hammer, using adz or ax. (See Nos. 24 and 26 above.)

B. METAL CONSTRUCTION - Plumbers and pipefitters are craftsmen who install pipe systems that carry water, steam, air or other liquids or gases needed for sanitation, industrial production, or other uses. To obtain a journeyman's license which some communities require, a person must pass a special examination to demonstrate knowledge of the trade and of the local building codes.

Sheet-metal workers are employed mainly by firms that fabricate and install heating, refrigeration, and air conditioning equipment, and by contractors engaged in residential, industrial, and commercial

building. Others are self-employed mainly on repair work or on smaller types of insulations.

A large proportion of iron workers are employed by general contractors on large building projects, by steel-erection contractors, or ornamental-iron contractors. Many are employed by large steel companies or their subsidiaries engaged in the construction of bridges, dams, and large buildings. Few ironworkers are self-employed.

1. Pipe Fitter I - (D.O.T. 862.381) - Lays out, fabricates, assembles, installs, and maintains piping and piping systems, fixtures, and equipment for steam, hot water, heating, cooling, lubricating and industrial processing systems on the basis of knowledge of system operation and study of building plans or working drawings. Selects type and size of pipe and related materials, inspects worksites, plans sequence of installation. Installs and maintains refrigeration and air conditioning systems, including compressors, pumps, meters, pneumatic and hydraulic controls and piping. May be designated according to the system installed as Pipe Fitter, Ammonis; Pipe Fitter, Gas Pipe; Pipe Fitter, Plastic Pipe; Pipe Fitter, Soft Copper.
2. Pipe Fitter II - (D.O.T. 862.381) - A term applied to a Laborer, Plumbing; Mucker, Cofferdam; or Pipe-Layer Helper when assisting in the installation of well-point pumps and in setting well-point pipe into sand or loose earth to provide subsoil drainage systems for excavation work below ground water level.
3. Boilermaker I - (D.O.T. 805.281) - Assembles and analyzes defects in and repairs boilers, pressure vessels, tanks, and vats in the field. Sets up rigging or signals crane operator to lift parts to specified position. Bolts or arc-welds structures and sections together. Assists in testing assembled vessels by pumping water or gas under specified pressure into vessel.
4. Boilermaker II - (D.O.T. 805.281) - Lays out, fabricates, and welds boilers, pressure vessels, or parts in boiler shop. May install and expand boiler tubes.
5. Boilermaker III - (D.O.T. 805.781) - Assembles boilers, tanks, vats, and pressure vessels using handtools and power tools. Bolts or screws accessories such as manholes, handholes, fans, gages, and valves to vessel using handtools and power wrenches.
6. Plumber - (D.O.T. 862.381) - Assembles, installs and repairs pipes, fittings, and fixtures of heating, water, and drainage

systems. Studies building plans and working drawings to determine work aids required and sequence of installations. Assembles and installs valves, pipe fittings, and pipes composed of metals, such as iron, steel, brass, and lead, and nonmetals such as glass, vitrified clay and plastic using handtools and power tools.

7. Structural-Steel Worker - (D. O. T. 801-781) - Performs any combination of the following duties to raise, place and unite girders, columns, and other structural-steel members to form completed structures or structure frameworks, working as a member of a crew. Sets up hoisting equipment, fastens steel members to cable of hoist using chain, cable, or rope. Signals worker operating hoisting equipment to lift and place steel member. Guides member with tag line or rides on member to guide it as it is hoisted into position. Forces members into final position, using turn-buckles, crowbars, jacks, and handtools. Bolts aligned members to keep them in position until they can be permanently riveted or welded in place. Catches hot rivets in bucket and inserts them in rivet holes using tongs. Bucks up rivets while pneumatic riveter uses airhammer to form heads on rivets. May specialize in erecting or repairing specific types of structures and be designated accordingly as Bridge-Maintenance Man; Chimney Builder, Reinforced Concrete; Scaffold Builder, Metal; or Structural-Steel-Equipment Erector.

8. Rigger - (D. O. T. 921.280) - Assembles rigging to lift and moves equipment or material. Selects cables, ropes, pulleys, winches, blockes, and sheaves according to weight and size of load to be moved. Attaches pulley and blocks to fixed overhead structures, such as beams, ceilings, and gin pole booms with bolts and clamps. Attaches load with grappling devices such as loops, wires, ropes, and chains to crane hook. Splices rope and wire cables to make or repair slings and cables.

9. Riveter, Hydraulic - (D. O. T. 800.782) - Operates hydraulic riveting machine to rivet steel plate sections together. Selects dies according to size of rivet and type of head to be formed. Starts machine and adjusts valve to regulate pressure according to size of rivet.

10. Riveter, Pneumatics - (D. O. T. 800.884) - Rivets together parts such as structures, plates and castings, pneumatic hammer. Places die against shank of rivet and presses trigger to pound and shape head of rivet shank.

11. Reinforcing-Iron Worker - (D. O. T. 801.884) - Positions and

secures steel bars in concrete forms to reinforce concrete. Determines numbers, sizes, shapes, and locations of reinforcing rods from blueprints, sketches, or oral instructions. Selects and places rods in forms, spacing and fastening them together, using wire and pliers. Cuts bars to required lengths, using hacksaw, bar cutters, or acetylene torch. May bend steel rods with handtools or rod-bending machine.

12. Reinforcing-Steel Worker, Wire Mesh - (D. O. T. 859.887) - Measures, cuts, bends, and fastens mesh used for reinforcing concrete on embankments and concrete road surfaces. May set redwood expansion joints for concrete paving.

13. Sheet-Metal Worker - (D. O. T. 804.281) - Fabricates, assembles, installs, and repairs sheet metal products and equipment, such as control boxes, drainpipes, ventilators, and furnace casings, according to job order or blueprints. Selects gage and type of sheet metal according to product being fabricated and knowledge of metal. Sets up and operates fabricating machines, such as shears and brakes, and straightens sheet metal. Shapes metal over anvils, blocks, or forms using hammer. Sets up and operates soldering and welding equipment to join together sheet metal parts. May be designated according to type of metal used as: Coppersmith; Tinsmith; or according to type of activity as Fabricator, Special Items; Product-Development Man; Roofer, Metal; Sheet-Metal Installer; Sheet-Metal Worker, Maintenance; Shop Mechanic I; or Model Maker, Sheet Metal.

14. Assembler Unit - (D. O. T. 706.884) - Assembles custom built metal products such as doors, windows, window screens, and metal orders, diagram, or layout. Bolts, rivets, crimps, or spot welds parts of window and door frames and attaches hardware, such as locks, hinges, and molding using power screwdriver, nut runner, arbor press, portable or stationary riveter, and spotwelding machine. May cut glass to specified size.

15. Duct Installer - (D. O. T. 804.884) - Installs prefabricated sheet metal ducts used for heating and air conditioning purposes. Assembles sections of sheetmetal duct according to specifications, using slip joints or metal screws. Cuts holes in ceiling and walls as required and makes holes and bends in metal to accommodate installation.

16. Ornamental Iron Worker - (D. O. T. 809.381) - Installs prefabricated ornamental ironwork, other than structural ironwork, such as metal window and door frames, motor-driven and automatic

power doors, metal trim and paneling and aluminum curtain-wall frames. Welds brackets to lintels, sills, columns, and other structural framework. Drills holes in metal, concrete and masonry structure using portable power drills, air-hammer, and handtools. Installs equipment such as motor driven or automatic doors. May be designated according to equipment installed or material worked as Ornamental Bronze Worker, Metal-Sash Setter, Ornamental Rail Installer, Steel-Door Setter, or Steel-Sash Erector.

18. Welder, Arc - (D. O. T. 810.884) - Welds metal parts together as specified by layout, diagram, work order, or oral instructions using electric arc welding equipment. Turns knobs on welding unit to desired amperage. Obtains specified electrode, connects cables from welding unit, starts power, strikes arc, and guides electrode. May be required to pass tests, such as Navy, Coast Guard, American Society of Mechanical Engineers, or American Bureau of Ships.

19. Welder, Atomic - (D. O. T. 810.884) - Welds metal parts using equipment which introduces hydrogen gas into electric arc formed between two tungsten electrodes to increase arc temperature and to shield weld area to prevent oxidation.

20. Welder, Gas-Shielded - (D. O. T. 810.884) - Welds metal using equipment which introduces shield of inert or noncombustible gas such as helium, argon, carbon dioxide, or nitrogen, around electric arc between electrode and workpiece to prevent oxidation. May be designated a Welder, Heliarc; or Tungsten Welder, Inert Gas.

21. Welder, Hand, Submerged Arc - (D. O. T. 810.884) - Welds metal parts, using handgun or crawler type gun which blows layer of powdered flux over workpiece to shield arc.

22. Welder, Gas - (D. O. T. 811.884) - Welds metal parts together as specified by layout, welding diagram, or work order using gas welding equipment. Positions parts in jigs or fixtures and obtains specified equipment. May be required to pass tests such as Navy, Coast Guard, American Society of Mechanical Engineers, or American Bureau of Ships.

23. Welder, Combination - (D. O. T. 812.884) - Welds metal parts together according to layouts, blueprints, or work orders, using both gas welding or brazing and any combination of arc welding processes. May position and clamp together components of fabricated metal products preparatory to welding, but does not perform layout, fitting and aligning.

24. Welder - Fitter - (D. O. T. 819.381) - Positions, fits, and welds fabricated, cast and forged components to assemble structural forms, such as machinery frames, tanks, pressure vessels, furnace shells, and building and bridge parts according to blueprints and knowledge of welding characteristics of metal. Selects equipment and plans layout, assembly, and welding, applying knowledge of geometry, physical properties of metal, effect of heat, allowances for thickness, machining weld shrinkage and welding techniques. May be designated as Welder, Tack; Welder, Structural Repair; Welder-Fitter, Arc; Welder-Fitter, Gas.

25. Brazer - (D. O. T. 814.884) - Brazes (bonds) together components to assemble metal parts as specified by layout, work order, or blueprints using hand torch. May be designated as Solder, Torch, or Brazer, Assembly Repair.

26. Automatic-Door Serviceman - (D. O. T. 829.281) - Installs, services, and repairs opening and closing mechanisms of automatic doors. Cuts holes in flooring, sets in and secures floor treadle activating mechanism and connects hydraulic power pack and electrical panelboard to treadle. Tests systems and repairs non-operating systems.

27. Millwright - (D. O. T. 638.281) - Installs machinery and equipment according to layout plans, blueprints and other drawings using hoists, lift trucks, handtools, and power tools. Reads blueprints and schematic drawings to determine work procedures. Dismantles, moves, assembles, and installs machinery and equipment such as shafting, conveyors, and tram rails.

C. MASONRY CONSTRUCTION - Bricklayers are craftsmen who construct walls, partitions, fireplaces, chimneys, and other structures from brick. They also work with various other masonry materials, such as concrete or cinder block; precast panels made of concrete, stone, or marble; porcelain glazed tile; structural tile; and terra cotta. They also install brick linings of industrial kilns and furnaces.

Marble setters, tilesetters, and terrazzo workers cover interior or exterior walls, floors, or other surfaces with marble, tile or terrazzo. The marble setter does little fabrication work because the marble and other materials are cut to size and polished before they are delivered to the worksite.

Cement masons and concrete finishers finish the exposed concrete surfaces on many types of construction projects. They direct the pouring of the concrete and supervise the laborers.

Most training authorities, including the National Joint Bricklaying Apprenticeship and Training Committee, recommend the completion of a 3-year apprenticeship program as the best way to learn bricklaying. Many workers in this trade have acquired bricklaying skills informally by working as helpers or hod carriers, observing or being taught by experienced bricklayers. Many of these persons have gained additional knowledge of their trade by taking trade school courses.

Marble setters, tilesetters, terrazzo workers and cement masons usually learn the trade by working in a 3-year apprenticeship program. A substantial portion of these workers, however, have acquired their skills informally by working as helpers, observing or being taught by experienced craftsmen.

1. Bricklayer - (D. O. T. 861.381) - Lays building materials, such as brick, structural tile, and concrete cinder, glass, gypsum and terra cotta block (except stone) to construct or repair walls, partitions, arches, sewers, and other structures. May be designated according to material used, such as Block Setter - Gypsum, Cinder-Block Mason, Concrete-Block Mason, Hollow-Tile-Partition Erector, Plaster-Block Layer, and Terra-Cotta Mason.
2. Bricklayer, Refractory Brick - (D. O. T. 861.381) - Lays fire-brick and refractory tile to build, rebuild, reline, or patch steam boilers, furnaces, converters, cupolas, ladles, and soaking pit. Spreads or sprays refractories over exposed bricks to protect them against deterioration by heat. May replace bolts, brackets, and heating elements, weld cracks or holes in shell. May be designated according to structure worked on, such as Bessemer-Bottom Maker, Coke-Oven Mason, Lip-and Gate Builder, Open-Hearth Door-Liner, and Vessel Liner.
3. Bricklayer, Sewer - (D. O. T. 861.381) - Lays brick, concrete blocks or shaped tile to construct sewers and manholes. May apply protective coating of concrete to interior and exterior surfaces, using trowel. May be designated according to type of material used, as Cement-Block Manhole Builder, Manhole Builder, Segmental-Block Layer, or Valve-Chamber Builder.
4. Chimney Builder, Brick - (D. O. T. 861.381) - Lays brick or tile to construct industrial smokestacks or chimneys of unusual heights. Attaches rigging and tackle to chimney to support scaffolding.
5. Silo Erector - (D. O. T. 861.381) - Erects silos by fitting together prefabricated concrete sections constructed to fit in

tongue and groove joints. Lifts concrete sections into position, using power hoist. Places metal hoops around silo at specified levels to insure rigidity of structure. Prepares specified mortar mixture.

6. Marble Setter - (D. O. T. 861.381) - Cuts, tools, and sets marble slabs in floors and walls of buildings and repairs and polishes slabs previously set in buildings. Trims, faces, and cuts marble to specified size, using power sawing, cutting, and facing equipment and handtools. Drills holes in slab, spreads mortar, sets slab in position, fills joints, cleans and bevels cracks or chips on slabs.

7. Monument Setter - (D. O. T. 861-381) - Erects stone monuments at cemetery grave sites following diagrams and written specifications. Lays out foundation, digs trench, mixes mortar, aligns and levels stone.

8. Permastone Man - (D. O. T. 861.781) - Casts artificial stone and applies it over surfaces of structures to provide decorative coating. Nails tar paper and lath, mixes and spreads mortar, and installs pre-cast permastone.

9. Soft-Tile Setter - (D. O. T. 861.781) - Applies decorative steel, aluminum, and plastic tile to walls and cabinets. Brushes waterproof compound, spreads adhesive, positions tile, removes excess cement. May be designated according to the type of tile applied, such as Metal Tile Setter or Plastic Tile Setter.

10. Stonemason - (D. O. T. 861.781) - Builds stone structures, such as piers, walls, and abutments, or lays walks, curbstones, or special types of masonry, such as alberene. Shapes stone, spreads mortar, aligns stone. May be designated according to masonry work performed, such as Alberene Stone Setter, Artificial Stone Setter, Curb Setter, Flagsetter, Granite Setter, or Gutter-Mouth Cutter.

11. Terrazzo Worker - (D. O. T. 861.781) - Applies cement, sand, pigment, and marble chips to floors, stairways, and cabinet fixtures to attain durable and decorative surfacing according to specifications. Spreads roofing paper, spreads mixture of sand, cement, and water over surface with trowel to form terrazzo base. Cuts metal division strips, spreads mixture of marble chips, cement, pigment, and water over terrazzo base to form finished surface. Scatters marble chips, pushes roller surface, allows surface to dry, and pushes electric-powered surfacing machine over floor to grind and polish terrazzo surface. May be designated

according to specific operations, such as Artificial Marble Worker, Terrazzo Finisher, or Terrazzo Polisher.

12. Tile-Conduit Layer - (D. O. T. 861.781) - Lays tile conduit to insulate and protect water or steampipes.

13. Tile Setter - (D. O. T. 861.781) - Applies tile to walls, floor, ceiling, promenade roof decks. Examines blueprints, measures and cuts metal lath, tacks lath to wall, spreads plaster base over lath, cuts and shapes tile with tile cutters and biters. Tile Fitter, Tile Layer, Tile Man, or Tile Mason are other job titles.

14. Tuck Pointer - (D. O. T. 861.884) - Repairs and finishes mortar joints between stones or bricks of masonry wall. Removes mortar from joints and trowels new mortar into joints.

15. Hod Carrier - (D. O. T. 869.887) - Supplies bricklayer, plasterer or stonemason with bricks, concrete, mortar, or plaster, using hod. Climbs ladders and walks along scaffold, when necessary, to reach workmen. Cleans excess mortar from finished work, using brush or scraping tool. May mix mortar and concrete by hand or by use of mixing machine.

16. Plasterer - (D. O. T. 842.781) - Applies coats of plaster to interior walls, ceilings, and partitions of buildings to produce finished surface, according to blueprints, architect's drawings, or oral instructions. Directs workers to mix plaster to desired consistency, spreads plaster, applies scratch brown or finish coats. May be designated by specialized methods, such as Ornamental Plaster Sticker, Plasterer Finish, Plasterer Rough, Plasterer, Spray Gun, Plasterer Molding (D. O. T. 842.781).

17. Cement Mason - (D. O. T. 844.884) - Smooths and finishes surfaces of poured concrete floors, walls, sidewalks, or curbs to specified textures, using handtools, including floats, trowels, and screeds. May be designated as Cement Finisher, Cement Paver, Concrete Finisher, Concrete Floater.

18. Stucco Mason - (D. O. T. 842.381) - Applies waterproof, decorative covering of portland or gypsum plaster to outside of building surfaces. Erects scaffolds. Decorates final or finish coat by marking it with sand or with brush and trowel, or by spattering it with small stones.

D. ELECTRICAL CONSTRUCTION - Construction electricians lay out, assemble, install and test electrical systems. These systems provide

heat, light, power, air conditioning, and refrigeration in residences, office buildings, factories, hospitals, schools, and other structures. Construction electricians also install and connect electrical machinery, electronic equipment, controls, and signal and communications systems. Construction electricians usually follow blueprints and specifications when installing electrical components. If there is no electrical drawing, the electrician terminates the incoming electrical service into a central load center. The electrician then installs interior circuits and outlets according to the amount of electrical current expected to be used in various sections of the building. He also installs fuses or circuit breakers of the proper rating in the incoming and interior circuits to prevent overloading, which causes overheating of wire, appliances, and motors. The construction electrician must know and follow National Electrical Code regulations, and in addition, must fulfill state, county, and municipal regulations. When installing wiring, the construction electrician uses a mechanical or hydraulic bender to shape conduit.

The electrician furnishes his own handtools such as pliers, screwdrivers, brace and bits, knives and hacksaws.

Most training authorities, including the National Joint Apprenticeship and Training Committee for the Electrical Industry, recommend the completion of a 4-year apprenticeship program as the best way to learn all aspects of the electrical trade. However, in the past, some construction electricians have acquired skills of the trade informally by working for many years as helpers, observing or being taught by experienced craftsmen. Many of these persons have gained additional knowledge of the trade by taking trade school or correspondence courses.

Many journeymen electricians become foremen or superintendents for electrical contractors on construction jobs. These craftsmen may also become estimators, computing material requirements and labor costs.

Many construction electricians go into business for themselves. As they expand their activities, they may employ other workers and become contractors. In most large urban areas, a master electrician's license is required to engage in an electrical contracting business.

1. Electrician - (D. O. T. 824.281) - Plans layout and installs and repairs wiring, electrical fixtures, apparatus, and control equipment. Plans new or modified installations to minimize waste of materials, provides access for future maintenance and avoids unsightly hazardous and unreliable wiring consistent with specifications and local electrical code. Prepares sketches showing location of all wiring and equipment or follows diagrams or blueprints

prepared by others, insuring that concealed wiring is installed before completion of future walls, ceilings, and flooring. Measures, cuts, bends, threads, assembles, and installs electrical conduit. Splices wiring to fixtures and equipment. Tests continuity of circuit to insure electrical compatibility and safety of all components, using standard instruments such as ohmmeter, battery, buzzer, or oscilloscope. May be required to hold license.

2. Electrician, Cable Splicing - (D. O. T. 829.381) - Splices overhead, underground, or submarine multiple conductor cables used in telephone and telegraph communication and electric-power transmission systems. Climbs utility poles or towers, or descends into sewers and underground vaults where cables are located.
3. Cable Puller (D. O. T. 829.884) - Pulls lead-sheathed electrical cables for communication, signal, and power systems through ducts. Pushes long, flexible, steel ribbon or rods through ducts. Attaches iron wire to rod or ribbon and pulls wire through duct. Attaches wire to cable and pulls cable through duct by hand or using winch. May pull ball or mandrel through duct to insure clear passage.
4. Calibrator - (D. O. T. 710.884) - Performs any combination of tasks involved in calibrating control instruments, such as thermostats, timing, and pressure-regulating devices. Sets controls to regulate current flow, timing cycle, pressure, or temperature. Positions dial plate of controls at reference point and adjusts calibration screw so that contact points open and close at specified temperature or pressure.
5. Central-Office Installer - (D. O. T. 822.381) - Installs equipment used to select, connect, and disconnect telephone lines in telephone company central office, following diagrams. Positions switching and power apparatus according to floor plans, using chain hoist when necessary. Tests operation of equipment after installation using electrical testing equipment such as electrical pulse repeaters and ohmmeters.
6. Conduit Man - (D. O. T. 869.381) - Builds and repairs concrete underground vaults and manholes and installs ducts to provide installation and maintenance facilities for underground power cables. Installs sheeting, shoring, and bracing for excavation. Builds wooden forms and erects steel reinforcing. Directs workers engaged in pouring concrete into forms, and removes forms after concrete has set.
7. Construction Checker - (D. O. T. 821.387) - Inspects and prepares reports concerned with construction and maintenance of electrical

powerline projects. Inspects pole installation to insure compliance with specifications.

8. Diesel Plant Operator - (D. O. T. 952.782) - Controls and maintains in efficient operating condition diesel electrical-generating units that produce electric power for distribution or supply electrical power for plant equipment.

9. Electrician, Power House - (D. O. T. 820.281) - Repairs and maintains electrical equipment in generating station or powerhouse. Tests defective equipment to determine cause of malfunction or failure using voltmeters, ammeters, and related electrical testing apparatus.

10. Electrician, Substation - (D. O. T. 820.281) - Inspects, tests, and maintains substation electrical equipment such as oil circuit breakers and transformers.

11. Equipment Installer - (D. O. T. 829.381) - Installs electronic control panels and mechanical equipment, such as motor generator units, battery chargers, utility reels, and darkroom equipment. Bolts and screws control panels and assembled operating units to framework. Connects electrical wiring and cables. Installs lighting fixtures, outlets, switches, wall boxes, and terminal boards.

12. Lineman - (D. O. T. 821.381) - Erects wood poles and prefabricated light duty metal towers, cable, and related equipment to construct transmission and distribution power lines used to conduct electrical energy between generating stations, substations, and consumers.

13. Groundman - (D. O. T. 821.887) - Performs a variety of tasks on ground to aid in erection of utility poles and installation and repair of overhead powerlines and communication lines.

14. Electric Distribution Checker - (D. O. T. 824.281) - Inspects and tests electric distribution equipment and wiring outside and within buildings to verify conformance of installation and building code specifications or to determine feasibility of increasing electrical load.

15. Air-Conditioning Installer, Domestic - (D. O. T. 827.884) - Installs domestic air-conditioning units, usually ranging from 1/2 to two ton capacity, in private residences and small business establishments. Inspects existing wiring and fuses on customer's premises to insure adequate power supply for operating air conditioner. Assembles unit window support and installs air conditioner. May change filter,

lubricate machine, replace fan motor or fan belt, and make minor adjustments.

16. Air-Conditioning Mechanic, Commercial - (D. O. T. 637.281) - See Plumber - Pipe Fitter.

E. FINISHING - Glaziers engaged in construction work, cut, fit, and install plate glass, ordinary window glass, mirrors, and special items such as leaded glass panels. The glazier puts a bed of putty into the wood or metal sash and presses the glass into place. Glaziers generally install all types of structural glass, both interior and exterior.

Most training authorities, including the National Joint Glazier and Glassworker Apprenticeship Committee, recommend the completion of a 3-year apprenticeship program as the best way to learn skills of the construction glazier.

Painting and paperhanging are separate, skilled building trades, although many craftsmen in these trades do both types of work. Both apply finishes to walls and other building surfaces.

Many painters and paper hangers work for contractors engaged in new construction. Substantial numbers of painters and paperhangers also are employed by contractors to do repair, alteration, or modernization work on existing structures.

1. Awning Hanger - (D. O. T. 869.884) - Attaches rigid or roll up canvas, metal, or plastic awnings onto buildings, using handtools and power tools. May measure buildings to develop specifications for fabrication of awnings. May fabricate awning frames or hang bunting, flags, and similiar decorations. May be designated as Awning Installer, Awning Erector, or Awning Maker and Installer.
2. Billboard Erector and Repairman - (D. O. T. 860.781) - Erects wood or metal framework for use as bulletin and poster panels for outdoor advertisements. Cuts wooden structural parts, directs hole digger truck driver, drills holes in masonry, and installs anchor bolts. Bolts, screws, or clips metal trim in place to form decorative seal for joints between panel and framework.
3. Cupboard Builder - (D. O. T. 703.884) - Assembles metal cabinets. Inserts pins in hinges to attach doors to cabinets. Attaches stationary knobs in place with screws. Fits, assembles, and attaches locks to doors. Measures and drills support holes in shelves and shelf brackets. May be designated as Cabinet Finisher.

4. Cabinetmaker - (D. O. T. 660.280) - Constructs and repairs wooden articles, such as store fixtures, office equipment, cabinets, and high grade furniture. Sets up and operates such woodworking machines as power saw, jointer, mortiser, tenoner, molder, and shaper to cut and shape parts. May be designated as Millman, or Cabinetmaker, Maintenance; or Carpenter, Bench.
5. Carpet Layer - (D. O. T. 299.381) - Lays carpet and rugs. Measures and cuts carpeting to size, using floor sketches. Sews sections of carpeting together by hand. Cuts and trims carpet to fit along wall edges, openings, and projections. May lay linoleum.
6. Door Hanger - See House Carpenter in this pamphlet.
7. Floorlayer - (D. O. T. 864.781) - Applies blocks, strips or sheets of shock-absorbing, sound-deadening, or decorative covering to floors, walls, and cabinets. Spreads adhesive cement over floor and lays covering on floor following guidelines. May be designated as Asphalt-Tile-Floor Layer, Cork-Tile-Floor Layer, Linoleum Floor Layer, Linoleum-Tile-Floor Layer, or Rubber-Tile Floor Layer.
8. Glazier - (D. O. T. 865.781) - Installs glass in windows, skylights, store fronts, and display cases, or on surfaces, such as building fronts, interior walls, ceilings, and tabletops. May install metal window and door frames into which glass panes are to be fitted. May assemble and install metal framed glass enclosures for showers. May be designated as Shower Enclosure Installer, Glazier, Structural Glass or Plate-Glass Installer.
9. Glazier, Stained Glass - (D. O. T. 779.381) - Selects and cuts colored glass for use in stained-glass windows in churches, memorials, and in residences. May assemble and cement sections of stained glass.
10. Insulation Worker - (D. O. T. 863.884) - Applies insulating material to exposed surfaces of equipment such as boilers, tanks, hot-or-cold air ducts, or pipes, and steam generators. May cover pipe with felt which is bound with wire, or gauze which is covered with plaster of Paris. May be designated as Blanket-Insulation Worker, Block Insulation Worker, Corkboard-Insulation Worker, Prefabricated-Pipe-Insulation Worker or Asbestos Worker.
11. Insulation Installer - (D. O. T. 863.884) - Fastens sheets, bat, blanket, and similar types of building insulation to walls, floors, ceilings, and partitions to prevent or reduce passage of heat, cold

or sound. Fastens insulation to joists, rafters, studs or furring strips. May fasten furring strips to walls, ceilings, or partitions to provide nailing base for insulation.

12. Insulation Hoseman - (D. O. T. 863.884) - Blows insulating material into spaces within walls, floors, and ceiling, using hose attached to blower to insulate buildings.

13. Metal Sprayer, Corrosion Prevention - (D. O. T. 843.782) - Controls portable flame spray equipment to spray corrosion-resistant coating such as zinc or aluminum. Cleans and roughens surface of object with blast of abrasive-laden compressed air (sandblast). May spray or brush paint or apply sealing material on coated surface for decoration or further protection. May flame-spray non-metallic objects such as glass or plastics.

14. Painter - (D. O. T. 840.781) - Applies coats of paint, varnish, stains, enamels, or lacquers to decorate and protect interior or exterior surfaces, trimmings, and fixtures. Paints surfaces, using brushes, spray gun, or paint rollers. Creates special effects by applying paint with cloth, brush, sponge, or fingers. May be designated as Painter, Interior Finish; Painter, Maintenance, Calciminer or Varnisher.

15. Painter, Rough - (D. O. T. 840.884) - Applies paint, varnish or enamel to exteriors and interiors of industrial plants or other structures such as barns, sheds, highway guard rails, and fences. May specialize in painting gas storage tanks which require working from swing scaffolds, high above ground.

16. Painter, Structural Steel - (D. O. T. 840.884) - Paints structural steel framework of buildings, girders, cables of bridges and other structural steel.

17. Paperhanger - (D. O. T. 841.781) - Covers interior walls and ceilings of rooms with decorative wall paper or fabric. May remove old paper using water or chemical remover and scraper.

18. Pipe Cleaning and Priming Machine Operator - (D. O. T. 862.782) - Operates pipe cleaning and priming machine to clean rust, scale, and dirt from pipelines, and to apply prime coating of hot asphalt.

F. EQUIPMENT OPERATORS - Operating engineers operate and maintain various types of power driven construction machinery. These machines include power shovels, cranes, derricks, hoists, pile drivers, concrete mixers, bulldozers, tractors, and pumps.

Operating engineers often are identified by the types of machine they operate: for example, Craneman, Bulldozer Operator, Derrick Operator or Heavy Equipment Mechanic. These craftsmen have a wide range of skills, working with many different machines--some complex and others relatively simple.

Although skills vary, the trend is toward more versatility. An individual who desires steady employment, particularly in construction, should know how to operate several different types of equipment. Operators prefer to work on more complex machines because wage rates for operating such machines are higher.

Most operating engineers are employed by contractors engaged in highway, dam, airport, and other large-scale engineering projects. They are employed in excavating, grading, landscaping, and in hoisting concrete, steel, and other building materials. Relatively few operating engineers are self-employed; those few are usually owner-operators of construction equipment, such as bulldozers, small cranes, and backhoes.

1. Core-Driller Foreman - (D. O. T. 850.131) - Supervises and coordinates activities of field crew engaged in obtaining substrata core samples for analysis of geological character of the ground, nature of ore, or type and strength of foundation materials.
2. Core-Drill Operator - (D. O. T. 930.782) - Sets up and operates drilling equipment to obtain solid core samples of strata for analysis. Drives or guides truck-mounted drilling equipment onto metal or wood foundation, or assembles equipment in position. Connects powerlines, attaches bit to rod. Moves clutch and throttle to control rotation and feed of drill bit into ground. Lubricates machine, replaces bits.
3. Core-Drill-Operator Helper - (D. O. T. 930.886) - Assists Core Drill Operator in setting up machine, labeling samples, and lubricating machine.
4. Labor-Gang Foreman - (D. O. T. 850.137) - Supervises and coordinates activities of work crews engaged in digging and backfilling excavations for laying pipeline and structure footings. May function as backfilling or ditching foreman.
5. Miller - (D. O. T. 850.781) - Drills and blasts earth and rock excavations to construct underground shafts and tunnels for projects, such as roads, railways, and waterways. Sets up pneumatic drilling machinery, loads blastholes and fires powder charges. May work in caissons.

6. Horizontal-Earth-Boring-Machine Operator - (D. O. T. 850.782) - Sets up and operates boring machine to drill horizontal holes through earth banks for installation of pipelines under highways, railroads canals, and other obstructions. Assembles and positions machine, signals operator of crane to lower boring equipment into previously dug starter hole. Manipulates machine controls to cause bit to extend and retract.
7. Horizontal-Earth-Boring-Machine Operator Helper - (D. O. T. 850.887) - Assists by laying foundation timbers, coupling auger sections and may weld sections of casing pipe together, using arc welding equipment.
8. Shield Runner - (D. O. T. 850.782) - Turns handcrank to regulate hydraulic valves that advance jacks used to push forward tunnel shield (steel framework having cutting edge used to support overlying ground during tunnel construction). Moves levers to regulate movement of steel arm attached to shield that lifts metal segments of tunnel heading into position.
9. Bulldozer Operator - (D. O. T. 850.883) - Operates tractor equipped with concave blade attached across front to gouge out, level, and distribute earth and to push trees and rocks from land for constructing roads and buildings or planting crops. Fastens attachments to tractor with clevis or wedge-pin hitches. Connects hydraulic hoses, belts, mechanical linkage, or power takeoff shaft to tractor. Moves levers to control tool bars, carriers and disks. Maneuvers tractor to raise, lower, and tilt attachment to clear right-of-way. May grease, oil, and repair tractor. May be designated by type of work done such as Grader Man, Scraper Man, Angledozer Operator, Crawler-Tractor Operator, Fine-Grade-Bulldozer Operator, or Scarifier Operator.
10. Dredge Leverman - (D. O. T. 850.883) - Operates dredging equipment on ladder, suction, dipper and clamshell dredges. Lowers dredging apparatus into water, lifts material out, deposits on scow, barge or on shore.
11. Dredge Operator - (D. O. T. 850.883) - Operates power-driven dredge (suction pump that sucks up sand, gravel, and water through discharge pipe that runs to shore or to scow) to mine sand and gravel at bottom of lakes, rivers, and streams. Directs workers engaged in placing shore anchors and cables, starts and stops equipment. May change position of dredge by drawing in or letting out anchor cables.

12. Lock Tender I - (D. O. T. 859.885) - Tends equipment to maintain flow of air to locks (chambers) to prevent injury to workers and inflow of water or semifluid earth during underground excavation for tunnels. Observes men or material in lock and turns valve to maintain air pressure at specified level.
13. Lock Tender II - (D. O. T. 850.883) - Operates electrically powered locomotive or electrically driven winch to move narrow-gage railroad into or out of material lock (pressurized air chamber) during tunnel construction.
14. Mucking-Machine Operator - (D. O. T. 850.883) - Operates powered shovel or scraper loader (mucking machine) to hoist earth and rock, excavated from tunnel headings, onto cars or trucks. Maneuvers machine on narrow-gage track and activates buckets or scrapers that scoop up materials and deposit them into dinkey cars, sweeps materials from sides and bottom of tunnel heading in radial movement and deposits them on conveyor.
15. Power-Shovel Operator - (D. O. T. 850.883) - Operates power-driven machine equipped with movable shovel, to excavate and move coal, dirt, rock, sand, and other materials. May be designated according to type of power unit operated such as Back-Hoe Operator, Convertible-Power Shovel Operator, Diesel-Power-Shovel Operator, Duck Bill Operator, Electric-PowerShovel Operator, Gasoline-Power-Shovel Operator, or Skimmer-Scoop Operator.
16. Rock-Drill Operator - (D. O. T. 850.883) - Operates portable wagon drill or drives tractor mounted rock-drilling machine to drill holes through hard material. Places timbers under wheels or manipulates lever to set outrigger jacks to level machine. Moves levers to start, stop, and control drilling speed of machine. May be designated according to type of machine operated as Reciprocating-Drill Operator, Rotary-Rock-Drilling Machine Operator, or Wagon-Drill Operator.
17. Scraper Operator - (D. O. T. 850.883) - Operates tractor-drawn or self-propelled scraper to move, haul, and grade earth on construction sites, such as roadbeds, pitch banks, and water reservoirs.
18. Tower-Excavator Operator - (D. O. T. 850.883) - Operates power machinery to activate dragline bucket slung between portable towers or to excavate and load sand, gravel, earth, or similar material into trucks or onto conveyors. Moves hand and foot levers to raise and lower bucket, load and dump bucket, and move bucket

along slack line. May direct workers engaged in changing position of towers; may be designated by the type of job or equipment, such as Cable-Tower Operator, Cableway Towerman, Guyline Operator, Slackline Operator, or Tower-Dragline Operator.

19. Trench-Digging-Machine Operator - (D. O. T. 850.883) - Operates machine, consisting of an endless chain or wheel of buckets mounted on tractor chassis, that digs trenches for sewer, water, drainage, oil and gas pipelines. Moves levers and depresses pedals to move and turn tractor. Guides machine along surveyed ditch line. Excavates trench to conform to grade specifications. May oil, grease and make adjustments and minor repairs to machinery. May be designated by type of job or equipment operated, for example, Ditch-Machine Operator, Rotary-Trencher Operator, Trench Operator, Trenching-Machine Operator, or Ditcher Operator.

20. Bell Man - (D. O. T. 850.884) - Shapes sides of bell hole in bottom of foundation holes to provide footings for concrete foundation piers for construction, such as bridges and buildings. Positions winch frame over foundation hole and aligns winch line with center of hole. Cleans loose dirt, clods, and stones from edge and sides of hole to prevent injury from falling objects. Rides winch line to bottom of hole observing formations to appraise possibility of cave-in. Digs earth from sides and slope of bell hole to specified dimensions. Shovels loose dirt into bucket and signals worker on surface to raise bucket.

21. Dredge-Dipper Tender - (D. O. T. 850.884) - Pushes hand and foot levers to move dipper stick of dredge, pulls rope to open hinged-bottom of dipper and dump excavated material.

22. Sewer-Bottom Man - (D. O. T. 850.884) - Shapes side walls and bottom of tunnel or open trench, excavated for large elliptical sewers, to conform to specified dimensions and grades. Trims walls and bottom, following guides, using hand shovel, spade, and pick. Shovels excavated material into wheelbarrows or into piles for removal. May be designated according to degree of trimming as an Invert Man, Trench Man, Trimmer, Fine or Trimmer, Rough.

23. Crushed-Stone Grader - (D. O. T. 850.887) - Shovels and rakes crushed stone to attain specified grade. Smooths sides, squares corners, levels bottoms of excavations, and completes other excavating operations that excavating equipment cannot perform.

24. Dredge Pipeman - (D. O. T. 850.887) - Installs and removes

lengths of pipe through which material dug from river or harbor bottom by suction dredge is discharged on shore. Assembles and aligns sections of quick-coupling pipe as needed. If pipe has flange fittings, places gaskets between flanges, aligns pipe, and bolts flanges together, using wrench. Often works from raft, small boat, or pontoons.

25. Laborer, Pile Driving, Ground Work - (D. O. T. 850.887) - Assists Leadsman, Pile Driving to erect piles and sheet piling for use in building structural foundations, retaining walls, and cofferdams. Lifts and carries steel and wooden piling, cleans piling, using shovel or ax. Applies grease to interlocking edges of sheet piling to facilitate driving. Moves wooden piles into hoisting position, using peavy. Attaches hoist line to concrete, steel casing, wood, or sheet piling for hoisting into driving position. May be designated by specific operations performed as Cant-Hook Man, Pile Driving; Groundman Linesman, Pile Driving; Lumber Handler, Pile Driving; Pile-Driver Helper; Pile-Driver Man, Groundwork; Piling Setter; Adzman, Pile Trimming and Capping; Axman, Pile Trimming and Capping; Pile Capper; and Pile Trimmer.

26. Laborer, Road - (D. O. T. 850.887) - Clears and levels terrain with handtools and performs other manual duties to assist in preparing right-of-way and grading excavation projects. Drives stakes to indicate path of right-of-way and grading excavation projects, such as roads, dams, and drainage channels. Burns brush to assist in clearing right-of-way. Spreads and levels dirt and gravel on roadways, borrow pits, driveways, and similar projects. Digs post holes, saturates loose dirt fill.

27. Sheet-Pile Hammer Operator - (D. O. T. 850.887) - Hammers sheet piling into ground around excavation to prevent cave-ins, using air-driven hammer equipped with U-shaped head that is adaptable to driving sheet piling. Lifts hammer to top of piling and places hammering head over edge of piling. May stand on stirrups protruding from side of hammer to add weight to force of hammer blows.

28. Mixing-Place Foreman - (D. O. T. 852.137) - Supervises and coordinates activities of workers engaged in mixing ingredients into concrete and in placing and finishing concrete in highway and airport runway construction.

29. Concrete-Paver Operator - (D. O. T. 852.883) - Operates machine to mix and pour concrete into forms for paving highways. Moves hand and foot levers to raise and lower skip, load mixer, place boom in position for pouring concrete, advance traveling bucke

on boom. Guides and advances machine as forms are filled with concrete. May clean, adjust, grease, and repair paver and attachments.

30. Concrete-Paving-Machine Operator - (D. O. T. 852.883) - Operates concrete paving machine to spread and smooth freshly poured concrete surfaces. Starts machine, engages clutch, and shifts gears to control machine's movement along rails on concrete forms. Operates machine with attachments to successively vibrate, screed, strike off, and float surface of concrete, to spray on curing compound, and cut expansion joints. May be designated according to specific function of machine, such as Center-Line - Cutter Operator, Concrete-Finishing-Machine Operator, Curing-Machine Operator, Gang-Vibrator Operator, Joint-Machine Operator, Longitudinal-Float Operator, Screed Operator, Spreader Operator, Strike-Off-Machine Operator, or Vibrating-Screed Operator.

31. Mud-Jack Operator - (D. O. T. 844.885) - Tends machine that forces grout into crevices, such as space between tunnel lining and surrounding earth, and fissures in rock foundations. Fills chamber of machine with grout with sand, cement, and water if machine has mixing device. Aims or inserts hose nozzle into space to be filled. Regulates valve that controls compressed air which forces grout through hose.

32. Asphalt-Paving Foreman - (D. O. T. 853.133) - Supervises and coordinates activities of workers engaged in spreading, rolling, and tamping asphalt or similar to form surfaces of highways, streets, parking lots, and aircraft landing strips.

33. Asphalt-Planer Operator - (D. O. T. 853.782) - Operates stationary or semiportable power-driven mixer that mixes ingredients, such as sand, stone, and naphtha with asphalt to produce asphalt paving material. Moves controls to start and regulate fires under boiler, asphalt heating unit, and aggregate drying drum. Reads gages and adjusts controls to insure that ingredients and bitumen are within specified temperature ranges. May direct Asphalt Mixer Man and Asphalt-Plant-Drier Operator. May be designated as Asphalt-Batcher Operator, Asphalt-Batch-Plant Operator, Blacktop-Plant Operator, or Hot-Mix Operator.

35. Asphalt-Paving-Machine Operator - (D. O. T. 853.883) - Drives machine that spreads and levels hot-mix bituminous paving material on subgrade of highways and streets. Bolts extensions to screed to adjust width, using wrenches. Lights burners to heat screed. Guides Dump-Truck Driver into dumping position at machine

hopper. Starts engine and controls machine to push dump truck and maintain constant pumping position. Turns valves to regulate temperature of material flowing from hopper when it begins to harden on screed. Turns handwheel to raise or lower screed to maintain specified thickness of paving. May be designated by operation of machine as Asphalt-Spreader Operator, Bituminous-Paving-Machine Operator, Black-Top-Spreader, Mechanical-Spreader Operator, or Paving-Machine Operator, Asphalt or Bituminous.

36. Stationary Engineer - (D. O. T. 950.782) - Operates and maintains stationary engines and mechanical equipment, such as steam engines, air compressors, generators, motors, turbines, and steam boilers, to provide utilities, such as light, heat, or power, for buildings and industrial processes. Reads meters and gages and adjusts controls of equipment to verify specified operating conditions. Records data, such as temperature of equipment, hours of operation, fuel consumed, and temperature and analysis of flue gases. May be required to hold license issued by state or municipality, restricting equipment operated to specified types and sizes.

37. Auxiliary-Equipment Operator - (D. O. T. 952.782) - Controls and maintains auxiliary equipment, such as pumps, fans, compressors, filters, feedwater heaters, chlorinators and condensers that supply water, fuel, lubricants, air and auxiliary power for turbines, generators, boilers, and other power-generating plant facilities.

38. Auxiliary-Equipment Tender - (D. O. T. 570.885) - Tends auxiliary equipment, such as pumps, motors, conveyors, to supply materials and power to slurry.

39. Dragline Operator - (D. O. T. 859.883) - Operates power-driven crane equipped with dragline bucket, suspended from boom by cable that is dragged toward crane to excavate or move sand, gravel, clay, mud, coal or other materials. Moves machine under its own power to worksite and directs workers engaged in placing blocks and outriggers to prevent capsizing when lifting heavy loads. May be designated according to type of chassis or power unit, such as Crawler Operator, Diesel-Dragline Operator, Electric-Dragline Operator, Gasoline-Dragline Operator, or Clay Hoister.

40. Blaster - (D. O. T. 859.281) - Assembles, plants, and detonates charges of industrial explosives to loosen earth, rocks, and stumps, or to demolish structures to facilitate removal. Examines mass,

composition, structure, and location of object to be blasted, estimates amount and determines kind of explosive to be used, and marks location of charge holes for drilling. Assembles primer and places it with main charge in hole or near object to be blasted. Covers charge with mud, sand, clay, or other material, and tamps it firm to improve detonation and confine force or blast. May operate jackhammer, hand drill, or electric drill. May climb cliffs or banks to plant explosive charge, using ropes and safety harness. May be designated according to object blasted such as Stumper or High Scaler.

41. Blaster Helper - (D. O. T. 859.887) - Assists blaster in placing and detonating explosives. Carries explosive bags, cartridges, or powder to blasting area. Connects explosive cord to blasting cap and lead wire to firing device or attaches fuse to charge.

42. Bull-Gang Man - (D. O. T. 929.137) - Any member of a crew engaged in manually lifting or moving heavy objects or materials.

43. Construction-Equipment Mechanic - (D. O. T. 620.281) - Maintains, repairs, and rebuilds, to conform to factory specifications, construction equipment, such as internal combustion engines, lighting plants, pumps, air compressors, concrete vibrators, and pneumatic tools.

44. Crane Operator - A term applied to workers who operate cranes to hoist, move, and place materials and objects, using attachments, such as a sling, electromagnet, grapple hook, bucket, demolition ball, or clamshell. Classifications are made according to type of crane operator such as Electric-Bridge or Gantry Crane Operator, Electric-Monorail-Crane Operator, Locomotive-Crane Operator, or Truck-Crane Operator.

45. Hoisting Engineer - (D. O. T. 921.883) - Operates compressed air, diesel, electric, gasoline, or steam drum hoists to control movement of cableways, cages, derricks, draglines, loaders, rail cars, or skips to move men and materials for construction and other industrial operations. May be designated according to equipment controlled as Cableway Operator, Cage Operator, Derrick Operator, Gin-Pole Operator, Capstan Man, or Concrete-Tower-Hoist Operator.

46. Holiday-Detector Operator - (D. O. T. 862.687) - Tests coating and wrapping of pipelines for holidays (inadequately coated areas), using electric detecting machine.

G. ENGINEERING AND SUPPORT OCCUPATIONS - Engineers and Technicians of all kinds function in the areas of materials and design to provide a flow of information to the construction sites. The following listing of job descriptions is a selection of some of the more obvious areas which hinge on Construction.

1. Architect - (D. O. T. 001.081) - See FINE ARTS AND HUMANITIES.
2. Civil Engineer - (D. O. T. 005.081) - Performs a variety of engineering work in planning, designing, and overseeing construction and maintenance of structures and facilities such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, water and sewage systems, and waste disposal units.
3. Construction Engineer - (D. O. T. 005.081) - Plans and designs details of structures such as buildings, bridges, waterworks, drainage systems, and utility tunnels and oversees their erection. Designs details of structure and writes materials and construction specifications. Estimates materials and labor costs. Oversees digging of excavations of building foundations and raising of superstructures. Oversees erection of machinery, apparatus, towers, and hoists for handling of steel, concrete, and stone. Conducts tests of materials and machinery. May be designated according to project engineered as Building Construction Engineer, Chimney Engineer, Civil Engineer, or Field Civil Engineer, Pipe-Line Construction.
4. Construction Inspector - (D. O. T. 182.287) - Inspects and oversees construction of bridges, buildings, dams, highways, and other types of construction work to insure that procedures and materials comply with specifications. Interprets blueprints and specifications for contractor and discusses deviations from specified construction procedures to insure compliance with regulations governing construction. Maintains daily log of construction and inspection activities. May be designated as Building Construction Inspector, Ditch Inspector, Highway Inspector, Masonry Inspector, Reinforced-Concrete Inspector, Rivet Inspector, Construction Inspector, Rod Inspector, Structural Steel Inspector, Tunnel Heading Inspector.
5. Building-Wrecking Foreman - (D. O. T. 869.137) - Supervises and coordinates activities of workers, such as Tractor-Crane Operator and Wrecker, engaged in razing structures, salvaging materials, and removing debris.

6. Construction Estimator - (D. O. T. 160.288) - See MARKETING AND DISTRIBUTION.

7. Clearing Foreman - (D. O. T. 869.133) - Supervises and coordinates activities of work crews engaged in clearing way for structures such as buildings, bridges, highways, and pipelines. Directs workers engaged in cutting timber, burning brush, blasting stumps, and grading and leveling land. Directs workers engaged in constructing temporary bridges and roads to provide access to construction site.

8. Draftsman, Civil - (D. O. T. 005.281) - Drafts detailed construction drawings, topographical profiles, and related maps and specification sheets used in planning and construction of highways, rivers, and harbor improvements, flood control, drainage, and other civil engineering projects. Plots maps and charts showing profiles and cross sections, drafts detailed drawings of structures and installations. May accompany survey crew in field to locate grading markers or to collect data required for revision of construction drawings. May be designated as Draftsman, Commercial (D. O. T. 017.281); Draftsman, Design; Draftsman, Electrical (D. O. T. 003.281); Draftsman, Heating and Ventilating (D. O. T. 017.281); Draftsman, Landscape (D. O. T. 019.281); and Draftsman, Map (D. O. T. 017.281).

9. Electrical Engineer - (D. O. T. 003.081) - Performs a variety of engineering work in designing, planning, and overseeing manufacture, construction, installation, operation, and maintenance of electrical or electronic components, equipment, systems, facilities, and machinery used in generation, transmission, distribution, and utilization of electrical energy for domestic, commercial, and industrial consumption. May be designated as Electrical Engineer, Power (D. O. T. 003.087); Distribution Engineer, Inductive-Coordination Engineer; Plant Engineer, Electrical; Protection Engineer; System-Planning Engineer; Transmission Engineer; Electrical-Equipment Engineer; and Signal Engineer.

10. Illuminating Engineer - (D. O. T. 003.081) - Designs lighting equipment and systems. Plans installation of lighting systems for buildings, streets, tunnels, fields and outdoor display. Oversees spacing, mounting, and size of equipment to adequately light objects to be seen and supervises installation.

11. Landscape Architect - See ENVIRONMENT.

12. Lubricating Engineer - See MANUFACTURING.

13. Safety Engineer - (D. O. T. 012.081) - Applies knowledge of industrial processes, mechanics, chemistry, psychology and industrial health and safety laws to prevent or correct injurious environmental conditions and minimize effects of human traits which create hazards to life and property or reduce worker morale and efficiency.
14. Surveyor - (D. O. T. 018.188) - Surveys earth's surface and oversees engineering survey party engaged in determining exact location and measurements of points, elevations, lines, areas, and contours of earth's surface to secure data used for construction, mapmaking, land valuation, mining, or other purposes.
15. Welding, Engineer - (D. O. T. 011.081) - Specializes in development and application of gas, electric, electron-beam, and pressure welding equipment and techniques to the design and fabrication of hard-to-weld metal alloys and assemblies.

CONSTRUCTION

WOOD

The grouping together of those occupations utilizing wood, wood products, and wood building systems as the primary building, assembling, and working materials. Included are occupations which by tradition and practice are normally included as a part of carpentry programs.

Fram
Floor
Form
Trim
Roof
Mate

METAL

The grouping together of those occupations utilizing metal, metal products, and metal building systems as primary building, assembling, and working materials.

MASONRY

The grouping together of those occupations utilizing masonry, clay products, and masonry building systems as primary building, assembling, and working materials.

Brick
Conc
Tile
Plas
Mate

ELECTRICAL

The grouping together of those occupations utilizing electrical materials, related electrical components, and electrical building systems as primary assembling and working materials.

FINISHING

The grouping together of those occupations utilizing finishing products and finishing building systems as the primary assembling and working materials.

Paint
Insu
Glas
She
Floor
Lan
Mate

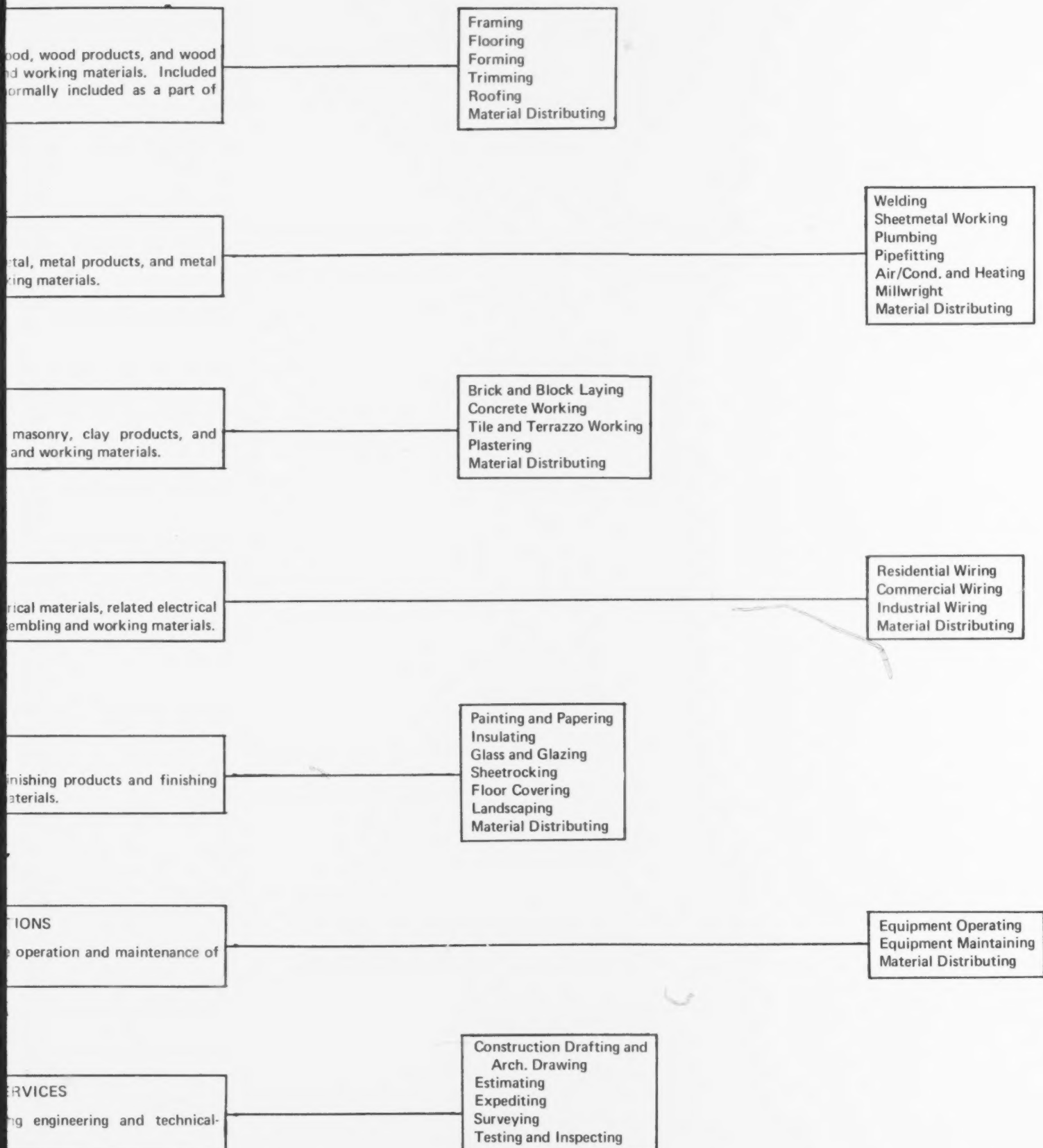
HEAVY EQUIPMENT OPERATIONS

The grouping together of those occupations utilizing the operation and maintenance of heavy equipment.

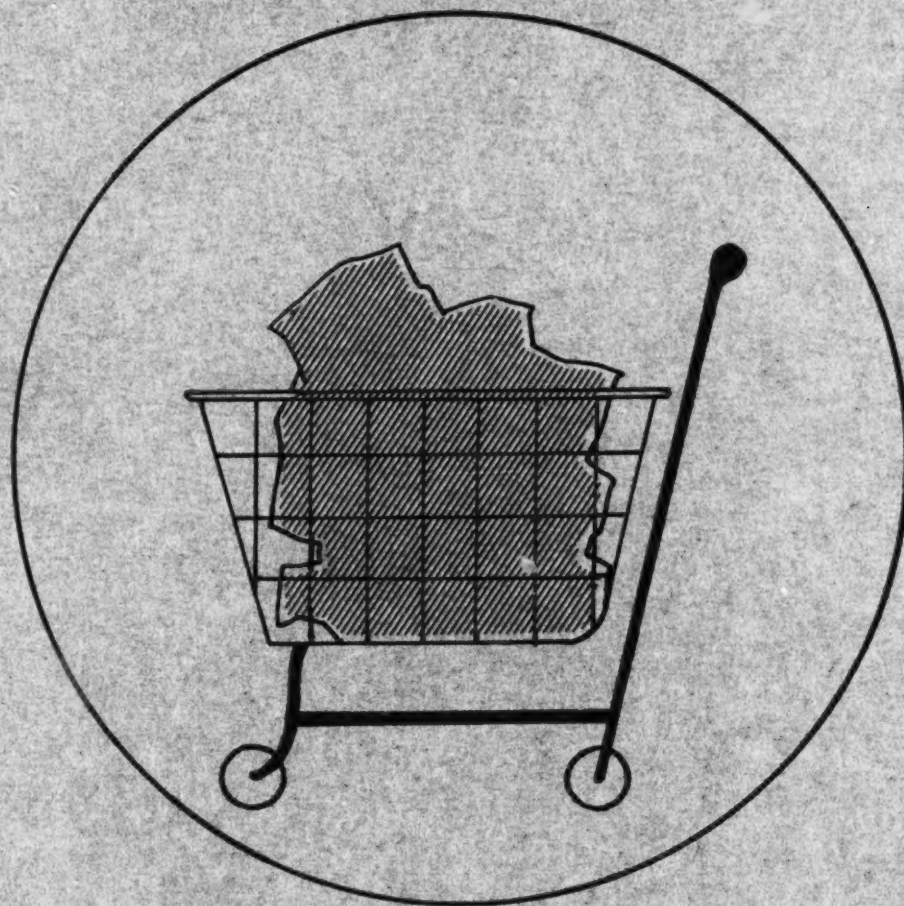
ENGINEERING AND SUPPORT SERVICES

The grouping together of those occupations utilizing engineering and technical-supportive training.

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CONSUMER AND HOMEMAKING EDUCATION



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CONSUMER AND HOMEMAKING EDUCATION

I. INTRODUCTION

The field of home economics has broadened considerably in the last two decades from the teaching of traditional homemaking skills, such as the preparation of food and the making of clothing, to include the teaching of consumer skills. The aim of home economics has remained consistent—the improvement of family living. Now the scope of this aim has been widened to include the welfare of the family in regard to its consumption practices.

The purpose of consumer education is to educate families to be able to make the most of the resources at their command, and to enhance individual, family and social well-being in the process. The consumer is encouraged to consider how he is affected by various economic forces and how the behavior of each individual affects the welfare of all. Indeed it has been suggested that the field of home economics be renamed "consumer economics".

In theory, consumer education does not include the teaching of selling skills or skills which enable a person to earn a living in other ways, but in practice the person who sells or promotes products and the person who offers consumer education services may be one and the same. Outside of the teaching field, most of the occupations available to the consumer and homemaking education specialist are in business, usually in the areas of research and testing of products or the promotion of products or services. Food specialists, housing and household equipment specialists, and clothing and textile specialists make up the greater part of this occupational cluster and generally find their places in the business world. This is not to suggest that they do not make a considerable contribution to the consumer.

This guide is offered to elucidate the growing possibilities for occupations in the area of Consumer Homemaking

Education, not only in business, but in all of the following areas:

- A. FOOD
- B. HOUSING AND HOUSEHOLD EQUIPMENT
- C. TEXTILES AND CLOTHING
- D. FAMILY ECONOMICS AND HOME MANAGEMENT
- E. FAMILY RELATIONS AND CHILD DEVELOPMENT

II. METHODOLOGY

The methods of research employed in preparing this pamphlet include a survey of available occupational resource materials, books on careers in home economics, and issues of The Journal of Home Economics, interviews with the Home Service Advisor at the local gas company and the Home Economics Advisor at the local electric company, and a request for materials on careers for home economics specialists from the American Association of Home Economists.

The libraries from which materials were gathered include Grayson County College, Austin College, Southern Methodist University and the Sherman Public Library. Other publications consulted included: The Dictionary of Occupational Titles and The Occupational Outlook Handbook published by the U. S. Department of Labor; Home Economic Careers For You by Velma Phillips; Your Future As A Home Economist by Jeanne Paris; Home Economics: Careers and Homemaking by Olive A. Hall; and Consumer Education and Home Economics in the Secondary Schools, a publication prepared by a committee of the American Home Economic Association working in conjunction with the National Education Association.

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

A. FOOD SPECIALIST - The areas of occupation open to a food specialist fall into three broad categories--basic and applied research and testing, food service management and the sales promotion of food products. A food and nutrition research specialist conducts chemical analysis of food preservation on nutritive value, and new methods of measuring the vitamin content of food. The improvement of existing foods and the development of new ones are the major pre-occupations of the food and nutrition research specialists, who need a strong background in the food sciences.

Public and private institutions and commercial food purveyors such as hotels, restaurants, tearooms and airlines, need food specialists to supervise food preparation and service. Training in restaurant or institutional management, business administration, or dietetics enables the food service manager to perform such duties as developing recipes and planning menus, ordering food, supervising the storage, preparation, and service of food, bookkeeping, and maintaining equipment and sanitary standards. Experience in the field of food service management may lead to the private ownership of a food establishment.

Food specialists who are employed by food companies and trade associations of food manufacturers, packers, and growers may be engaged in either the development or the promotion of products, or in both. The aim of the food specialist involved in promotional work is to interpret consumer wants and needs to the producer and to bring the product with all its possibilities to the attention of the consumer. If involved in the promotion of food, the food specialist may be engaged in advertising, publicity or public relations. Some food specialists who are skilled in sales promotion and consumer services may serve as free-lance food consultants to food companies or organizations, advertising or public relations firms or to photographers.

The food specialist may also go into social welfare and public health, serving such places as clinics, day-care centers, public health departments, and state institutions. See PUBLIC SERVICE for more information.

1. Food Service Supervisor - (D.O.T. 319.138) - Trains and supervises employees engaged in serving food and maintaining cleanliness of food service areas and equipment in public and private institutions, and commercial food establishments. Supervises serving of meals in dining rooms or in tray line. Keeps records, such as amount and cost of meals served and hours worked by employees. Requisitions, supplies and equipment to maintain stock levels. May direct preparation of foods and beverages. May assist dietician in planning menus.
2. Food and Beverage Analyst (Kitchen Research Worker) - (D.O.T. 310.287) - Examines food samples and food service records and other data to determine sales appeal and cost of preparing and serving meals and beverages

in establishments such as restaurants, cafeterias or food chain establishments. Converts recipes for use in quantity preparation. Studies reservation lists and previous records and forecasts customer traffic and number of servings required for a specified period of time. May investigate complaints relative to faulty cooking or poor quality of ingredients. May plan menus. May supervise Food Controller (D.O.T. 216.488) and kitchen employees.

3. Food Chemist (Food Analyst) - (D.O.T. 022.081) - Conducts experiments in chemistry of foods. Experiments with natural and synthetic materials or by-products to develop new foods, food preservatives, anti-adulteration agents, and similar products. Studies effects of various methods of preservation on nutritive content and palatability. Tests food samples, such as starch and sugar products, cereals, canned and dehydrated foods, dairy products, vegetables, meats, flavorings, and other products to insure compliance with government food laws. May perform or supervise personnel performing quality control tests in food processing. May specialize in a particular food or food product. May be designated as a Food Scientist or a Food Technologist (D.O.T. 022.081, 040.081, 041.081).

4. Food Processing Technician - (D.O.T. 022.281) - Assists food scientists in research and development and in the quality assurance laboratories of processing plants and serves as assistant supervisor of personnel in production-related operations such as processing, packaging, sanitary maintenance, and waste disposal. In research and testing, assists in improving existing food products, creating new food items, and improving production processes. In quality control laboratories, conducts bacteriological, chemical, and physical tests to insure conformance with established government and industry standards. In production operations, assists in overall processing of food products, inspects incoming raw materials, recommends measures to improve production methods, equipment performance, and quality of product. May be designated Laboratory Tester or Quality Control Tester (D.O.T. 160.203, 022.281, 029.381).

5. Food Products Tester; Tester, Food Products - (D.O.T. 090.203, 199.281) - Mixes and cooks or bakes experi-

mental food products, such as cake mixes or refrigerated biscuits, cookies or rolls. Selects recipes from conventional cookbook and substitutes dehydrated ingredients for fresh where feasible. Evaluates cooked or baked item as to texture and density and records amounts and kinds of ingredients used and results of experiment. Tests products for deterioration during storage. Suggests new products and product improvements.

6. Research Nutritionist - (D.O.T. 077.081) - Performs research in improvement of food as related to appearance, palatability, and nutritional value. Studies and analyzes recent scientific discoveries in nutrition for application in current research, for development of tools for future research, and for interpretation to public.

7. Dietician - (D.O.T. 077.128) - Plans and directs food service programs in public and private institutions and establishments. Plans menus and diets providing required food and nutrients to feed individuals and groups. Directs workers engaged in preparation and serving of meals. Purchases or requisitions food, equipment and supplies. Maintains and analyzes food cost control records to determine improved methods of purchasing and utilizing food, equipment and supplies. Inspects work areas and storage facilities to insure observance of sanitary standards. May instruct individuals and groups in application of principles of nutrition. May prepare educational materials on nutritional value of foods and methods of preparation. May be Administrative Dietician (D.O.T. 077.168) or Dietician Chief (D.O.T. 077.118). May teach dietetics, nutrition, or institutional management to Dietetic Interns. A Therapeutic Dietician (D.O.T. 077.128) plans and directs preparation and service of menus for patients prescribed by a physician.

8. Dietary Consultant (Institutional-Nutrition Consultant) - (D.O.T. 077.128) - Advises and assists public and private institutions and establishments, such as child care centers, hospitals, nursing homes, and schools, on food service management and nutritional problems in group feeding. Plans, organizes, and conducts such activities as in-service training courses, conferences, and institutes for food-service managers, food handlers, and other workers. Develops and evalu-

ates informational materials. Studies food service practices and facilities and makes recommendations for improvement. Confers with architects and equipment personnel in planning for building and remodeling food service units.

9. Plant Hostess - (D.O.T. 297.258) - Conducts visitors through bakery and explains production processes. Displays products and lectures on nutritional value at schools and clubs and distributes samples. Schedules lunches in private homes to advertise products, prepares and serves food, and delivers lectures on products used. May arrange for and conduct demonstrations of bakery products in food stores. May train demonstrators. See **MARKETING AND DISTRIBUTION** for Demonstrators.

10. Home Service Director, Food Company - (D.O.T. 096.168) - See Home Service Director, this pamphlet.

11. Consumer Service Specialist - Investigates consumer needs and interprets them to producer. Prepares recipe folders, booklets, cookbooks, directions on packages, and other consumer materials. May perform or supervise personnel performing tests on manufacturer's products in research test kitchen to analyze product and develop recipes. Conducts and supervises store demonstrations and gives talks to consuming groups and businessmen. Handles consumer and professional correspondence. May be in charge of publicity and advertising. Prepares material and checks scripts for radio and television and assists in production of radio and television programs. May prepare food for photography. May write articles for newspapers and magazines and check advertising copy.

12. Food Journalist - Employed by publishers of periodicals and newspapers and by radio or television stations to originate and test recipes for publication or broadcast. May write articles, have syndicated column, or radio or television program. May answer requests from readers or listeners and assist in food photography. If employed by food manufacturing firm or organization, duties are much the same as the editorial duties of the Consumer Service Specialist: prepares consumer materials, handles consumer and professional correspondence, checks advertising copy, assists in the production of radio and television programs, and writes articles for magazines and newspapers.

B. HOUSING AND HOUSEHOLD EQUIPMENT SPECIALIST -

The housing specialist works with home builders and architects to create more beautiful and efficient housing through developments in interior design and decoration. An understanding of basic construction, architecture, and engineering enables the housing specialist to tackle such designing problems as the use of space, the arrangement of the kitchen and laundry room, and the proper placement of lighting. Home-building companies, housing organizations, and architectural firms are possibilities for employment for a person with these skills. The housing specialist may concentrate on interior decoration and thus be concerned mainly with home furnishings. See FINE ARTS AND HUMANITIES for further information on Interior Decorators.

Manufacturers of household equipment need equipment specialists to put the theories of their engineers and designers to the test of practical use in the test kitchen and laboratory. A knowledge of the food sciences and of physics aids the equipment specialist in testing kitchen and laundry appliances and their related products, other electric housewares, and kitchen utensils. Sales promotion is another important area for the equipment specialist. Through the demonstration of the use and care of equipment to the public or to company employees, the development and testing of recipes, and the development of instruction booklets and other consumer materials, the equipment specialist serves as a link between the consumer and the producer. If employed by a utility company, the equipment specialist is promoting the utility rather than the equipment, although the tasks performed are essentially the same as with a manufacturing firm. If involved in the promotion of household equipment, the equipment specialist may be engaged in advertising, publicity, or public relations. This specialist may become a free-lance equipment specialist to household equipment manufacturing firms, advertising or public relations firms or to photographers.

1. Tester (Electric Equipment) - (D.O.T. 729.387) - Inspects and tests household appliances, such as ranges, water heaters, and food mixers, for appearance and mechanical and electrical characteristics, using testing devices and handtools. Connects unit with power source and testing devices, such as wattmeter, voltmeter, and potentiometer. Runs unit through operating cycles, observes meters and compares readings against standards

to determine electrical characteristics. May specialize in inspection of appearance and mechanical operation and be designated Appliance Inspector. May specialize in electrical testing and be designated as Appliance Tester.

2. Household-Products Technician - (D.O.T. 168.387) - Compiles data concerning household products, such as waxes, cleaners, insecticides, and air purifiers. Applies product to various surfaces and evaluates against competitor products. Compiles and tabulates data from consumer surveys. Prepares data for use by marketing division. Answers customer calls for product information. Recommends products for various applications. May operate floor polisher, scrubber, and laundry appliances.

3. Consultant on Housing Design - Consults with home builders and architects to achieve efficient arrangements in housing. Particularly concerned with the use of space in kitchen, laundry and storage areas. Also concerned with proper design of equipment to be used in home as well as its proper placement. Must be aware of new trends in consumer preferences in housing design.

4. Color Expert - (D.O.T. 141.051) - Advises clients on fashionable shades and color combinations in paper, paint, draperies, floor coverings and other permanent installations for furnishing interiors of homes, offices, and other commercial establishments.

5. Home Service Representative - (D.O.T. 278.258) - Demonstrates the use and care of gas or electrical equipment and appliances to promote sales and advises homemakers in efficient use of fuel in homes. Visits customer's home to demonstrate appliances and resolve problems concerning their use. Explains use, operation and care of household equipment to community groups to promote its utility, and to dealers, salesmen, and utility company employees as part of training programs. Writes articles and pamphlets to inform public concerning methods of laundering new fabrics, use of new equipment, and methods of food preparation. Answers requests for information concerning appliances. May represent utility company as guest on radio, television and other programs. May advise customer on related homemaking problems, such as kitchen planning and home lighting.

6. Home Service Director - (Director of Home Economics) - (D.O.T. 096.168) - Plans, coordinates and directs consumer education service or research program for equipment, food or utility company to promote goodwill and sale of products or services. Studies and interprets data concerning consumer habits and preferences to aid company in product development. Organizes program to educate consumers in use of equipment, product or service. Coordinates testing of recipes and development of new uses of product or equipment. Writes articles and plans preparation of instructional manuals, booklets on product uses, and other consumer publications. Advises on content and accuracy of sales promotional material such as advertising-copy.

7. Home-Lighting Advisor - (D.O.T. 299.258) - Discusses with customers more effective use of electric-lighting facilities. Tests distribution and intensity of light in rooms with existing arrangement, using a light meter. Demonstrates advantages of changes, such as light rearrangement, bulbs suited for reading, sewing, and other purposes, and uses of reflectors. Suggests changes in color decorations and furnishings to increase light.

8. Home-lighting Demonstrator Supervisor - (Home Service Division Supervisor) - (D.O.T. 163.168) - Directs activities of home lighting demonstration department to educate public in most economic and beautiful utilization of lighting equipment. Cooperates with lighting fixture dealers and distributors in joint community sales campaigns. Directs and assists in home visitation program. Gives demonstrations with lighting equipment and slide projector, and lectures to clubs, store buyers and salesmen. Supervises clerical workers in departments.

9. Housing and Household Equipment Journalist - Employed by the publishers of newspapers and periodicals and by radio or television stations to test new appliances and report on their performance. May report on new developments in housing design and decoration. May answer requests from the public and assist in photography. If employed by a manufacturing firm or other business, duties are much the same as the editorial duties of the Home Service Director

(No. 6 above), handles consumer and professional correspondence, prepares consumer materials, checks advertising copy, assists in the production of television and radio programs, and writes articles for magazines and newspapers.

C. TEXTILES AND CLOTHING SPECIALISTS - The areas of occupations available to the Textiles and Clothing specialist fall into the categories of textile testing and research, retailing and merchandising, and fashion styling and design. The textile specialist in research tests natural and synthetic fibers to determine the wearing and laundering performance of fabrics. Tests are conducted on such things as color fastness, fiber content, thread count, and tensile strength. Clothing and textile research may also delve into subjects such as establishing consumer standards, clothing consumption, and problems of clothing construction with modern fabrics.

If interested in textiles and clothing in relation to business, the textile and clothing specialist is aided by the formal study of retailing and merchandising, but many in this area receive on-the-job training. Retail business offers opportunities as a salesperson, comparison and personal shopper, buyer, stylist, fashion coordinator, or bridal consultant. Some of these occupations are discussed more thoroughly in **MARKETING AND DISTRIBUTION**. Positions in sales promotion and consumer services are to be found with pattern companies and sewing machine manufacturers, as well as with retail stores and clothing and textile manufacturing firms. The specialist in sales promotion endeavors to interpret consumer needs to the producer and to bring the producer's product to the attention of the consumer, and may be involved in advertising, publicity, or public relations tasks. The specialist who is skilled in these areas may serve as a free-lance textile and clothing consultant to manufacturing firms, retail businesses, advertising or public relations firms, or to photographers.

The designing field requires a good training in art and offers positions such as fashion illustrator, textile and clothing designer, and creative displayer. More information on these occupations can be found in **FINE ARTS AND HUMANITIES**.

1. Cloth Tester (Textile Technician) - (D.O.T. 029.381)
- Subjects cloth to standardized physical and chemical tests and compares test results with samples or prepared standards, such as charts, graphs, and tables, to verify adherence to specifications. Determines number of threads per inch and identifies types of fibers. Tests cloth for weight, fastness of dye, type of material, tensile strength, shrinkage, or absorbency, using special testing devices, chemicals, water, heating and drying oven, dehumidifier, and scale. May mix and apply chemicals to remove stains from fabric soiled in manufacture or transit. May be designated Laboratory Assistant for Synthetic Fibers (D.O.T. 022.281) or for Textiles (D.O.T. 689.384).
2. Textile Chemist - (D.O.T. 022.081) - Conducts research in chemistry of textiles and institutes methods to control processes for scouring, bleaching, mercerizing, and dyeing textiles. Experiments with synthetic and regenerated fibers, animal hair, feathers, cellulose products, and other materials to develop new textiles. Investigates problems relating to textile chemistry, such as treatment of fabrics to impart water, fire, mildew or insect resistant qualities, to reduce fabric shrinkage, or to develop qualities of shape retention and abrasion resistance. May analyze dyes, alkalies, acids, bleaches and finishes for conformance to specifications.
3. Buyer - (D.O.T. 162.158) - See MARKETING AND DISTRIBUTION.
4. Fashion Displayer (decorator) - (D.O.T. 298.081) - See MARKETING AND DISTRIBUTION and FINE ARTS AND HUMANITIES.
5. Personal and Comparison Shoppers - (D.O.T. 296.358 and 296.388) - See MARKETING AND DISTRIBUTION.
6. Fashion Designer - (D.O.T. 142.081) - See FINE ARTS AND HUMANITIES.
7. Fashion Coordinator - (D.O.T. 185.158) - Coordinates promotional activities, such as fashion shows, to induce customer acceptance. Studies fashion and trade journals, travels to garment centers, attends fashion shows, and

visits manufacturers and merchandise markets to obtain information on fashion trends. Confers with buying personnel to determine type of fashions the store will purchase and feature for each season. Advises publicity and display departments of merchandise to be publicized. Selects garments to be shown at fashion shows. Provides information to personnel on current fashions, style trends, and use of accessories. Also included in MARKETING AND DISTRIBUTION.

8. Bridal Consultant - (D.O.T. 299.358) - Compiles list of prospective brides from newspaper announcements or engagements. Mails promotional material to offer consultant services. Recommends trousseau for bride and costumes and accessories for attendants. Aids in selection of silver pattern, china, glassware, stationary, invitations, flowers and catering service. May display and sell wedding trousseau to bride and attire for attendants. May compile and maintain gift register on which items purchased at store for bride and groom are listed. May arrange for wedding photography and accompany bride when shopping in store or shop for her. May attend rehearsals and ceremony to give advice on etiquette. Also included in MARKETING AND DISTRIBUTION.

9. Sewing Instructor - (D.O.T. 297.458) - Demonstrates sewing machines and their operation to retail store customers. Shows customers recommended procedures for cutting material from patterns, assembly, basting, and machine sewing. Demonstrates use of various machine attachments. May instruct customers in alteration of garments.

10. Drapery and Upholstery Estimator, Measurer and Hanger - (D.O.T. 299.488, 299.381, and 299.884) - Calls at customer's homes to take measurements for and estimate cost of fabricating draperies, window shades, slipcovers, and upholstery; installs draperies in customer's home.

11. Consumer Service Specialist - Represents company's product to consumer and interprets and relates consumer needs to company. Creates awareness of new textile developments, fashion trends, and innovations in patterns and sewing machine equipment and develops new

buying habits among consumers. May be involved in sales training and personnel work, including giving demonstrations and talks. Handles consumer and professional correspondence and prepares consumer materials. May be in charge of publicity and advertising work. Prepares material and checks scripts for radio and television and assists in production of radio and television programs. May prepare clothing for photography. May test product to insure customer satisfaction. May write articles for newspapers and magazines and check advertising copy.

12. Educational Director - Develops new and easy sewing techniques to be incorporated in pattern and sewing books. Prepares visual aids and conducts in-service teacher programs. Develops special patterns and other teaching aids for sewing teacher. Consults with designers in creating fashions. May be involved in product development and testing of product's performance. May also serve in area of consumer service by handling consumer problems in sewing. In response to home sewing problems, offers professional advice to home sewers and suggests revisions and improvements in product to company.

13. Fashion Journalist - Employed by publishers of periodicals and newspapers and radio and television stations to report on new fashions and fashion accessories. May write articles, have syndicated column, or program on radio or television. Attends fashion events and interviews experts on new clothing and textile developments to secure information for articles or broadcasting. May answer requests for public and assist in fashion photography. If employed by retail business or manufacturing company, duties are much the same as the editorial duties of the Consumer Service Specialist (No. 11 above): prepares customer materials, handles consumer and professional correspondence, checks advertising copy, assists in the production of radio and television programs, and writes articles for magazines and newspapers.

D. FAMILY ECONOMICS AND HOME MANAGEMENT - Family Economics and Home Management Specialist - The specialist in Home Management and Family Economics is concerned with the most efficient use of time, energy,

and money in managing a household. Such factors as family income and expenditure and the work methods of the the homemaker are of vital concern in solving financial problems. The consultant in this field reaches the public through publications, films, exhibits, talks to organizations, and personal consultations. The researcher in family economics is essentially concerned with determining what portion of income families spend on food, clothing housing, medical care and other expenses, and, then with relating this to living costs and standards. In home management, the researcher may observe the work methods of homemakers in their home environments to develop ideas for simplifying work tasks. The family economics and home management specialist may concentrate on helping individuals and families to apply sound principles of consumerism to household and financial management. Positions are available in banks, loan companies, large department stores, and welfare agencies for a person with these abilities. In welfare agencies, the financial specialist is concerned with developing budget standards to determine how much assistance a family needs. In public health the home management specialist assists disabled homemakers in developing household arrangements and work methods in accordance with the disability.

1. Researcher in Home Management and Family Economics - In family economics researches such subjects as what portion of income families spend on major costs, marketing and consumption practices to determine what influences people in their purchases, family financial records to reveal what sort of records people do and should keep, the different needs of families at various stages of the life cycle, and living costs and standards. In home management, researches such things as the management of time, the most efficient arrangement of kitchen and use of storage space, the work habits of the homemaker, and how the family members work together to perform household duties in order to develop methods of work simplification.

2. Director of Consumer Education - Guides families in the selection and care of products on the market to help them make the most efficient use of their resources. Teaches the consumer to recognize sound design, quality performance, and true economy of a product. Must be informed on new developments in household equipment, clothing and textiles, home

furnishings and food products. Must be able to evaluate economic condition of family and advise on sound budgeting. May participate in training programs of staff. May contact public through talks, appearances on radio and television, exhibits, films and the development of consumer materials.

3. Budget Consultant (Family Finance Specialist) - (D.O.T. 096.268) - Advises customers of bank and loan companies on personal and family financial problems. Conducts research to determine amount spent by family for food, clothing, housing and medical care. Provides advice on family spending and saving through publications, films, exhibits, and personal consultations. Addresses organizations and appears on radio and television to promote effective money management. May be self-employed.

4. Home Management and Family Economics Journalist - employed by publishers of periodicals, or magazines and by radio or television stations to report on subjects which promote efficient management of household and finances and sound consumerism. May write articles, have a syndicated column, or a radio or television program. If employed by a company, may give talks, show films, and develop educational materials.

E. FAMILY RELATIONS AND CHILD DEVELOPMENT -

The specialist in this area is concerned with all the facets of family relationships and how the total family environment affects the development of the child. The relationship of the parents, of the parents with the children, and of the children with each other, along with such factors as the family's economic situation, the education and intelligence of the parents, and the emotional stability of the home environment, are considered in understanding the intellectual and emotional development of the child. Most specialists in this area become teachers in nursery schools, helping to guide the social and mental development of children. The teacher may have opportunities to promote good family relations by helping parents to understand the behavior of their children. Teachers are needed at nursery schools, in welfare programs, health centers, churches, housing units, industrial plants, or in private nursery schools. A background in child development, family relations, and parent education helps the educator or the researcher in this area to understand the total

family. Most of the research in this field has been done by sociologists, psychologists, and psychiatrists, but there is a growing need for home economists trained in family life and child development to participate in research.

1. Researcher in Child Development and Family Relations - Studies the various relationships within the family, the various factors which may have an effect on these relationships (such as size of family, economic situation, health problems, or emotional stability of family members), and how the total family environment affects the development of the children. Relates child's personality patterns and degree of emotional adjustment to various factors in child's background. Studies intellectual growth patterns of the child by noting such things as language development. Considers the effect on the child's mental development of such things as children's literature and playthings and experiences in nursery school.

2. Nursery School Teacher - (D.O.T. 359.878) - See PUBLIC SERVICE.

3. Family Relations and Child Development Journalist - Employed by the publishers of periodicals and newspapers and by radio and television stations to report on subjects aiding in the understanding of child development and family relations. Covers a myriad of topics, such as, behavioral traits typical of certain age groups, development of financial responsibility in teenagers, or effective methods of discipline. May write articles, have a syndicated column, or a radio or television program. May answer requests from the public.

F. EXTENSION SERVICE - The extension service specialist is a representative of a state college or university and/or the Department of Agriculture, whose chief aim is to aid the homemaker in developing better homemaking skills. She deals with clothing, food, home decorating, money management, household equipment, child development and family life. This diversity of skills requires a broad background in home economics. She works with adults or youths on an individual basis or in groups. She may have contact with the general public by giving demonstrations, writing articles, or conducting radio and television talks on such

subjects as food selection and preparation, child care, or managing the household budget. She plays an important part in the rural community by doing such things as judging fairs, supervising canning programs, or serving as a 4-H Club Leader.

1. Specialist-In-Charge - (D.O.T. 096.168) - Directs and coordinates activities of extension service specialists and develops services in specialized field of home economics. Plans procedures and analyzes data for use by extension service specialists, and supervises their activities to assist extension workers and their volunteer helpers in solving domestic arts problems. Recruits and hires workers for specialized extension program services, and conducts training programs for new employees. Prepares activity, planning and other reports, and maintains service records. Prepares budget requests.

2. Extension Service Specialist (Home Economics) - (D.O.T. 096.128) - Instructs extension workers and develops specific service activities in home economics. Develops training programs in subjects such as home management. Prepares leaflets, pamphlets, and other material for use in training aids. Conducts classes to train extension workers in specialized fields and in teaching techniques. Delivers lectures to commercial and community organizations and over radio and television to promote developments of domestic skills. Analyzes research data and plans activities to coordinate specialized services with other extension services and with services provided by other public agencies and commercial organizations.

3. District Extension Service Agent (Home Economics) - (D.O.T. 096.168) - Supervises and coordinates activities of workers engaged in home economic services. Conducts training programs to instruct extension workers in home economic services such as food preparation and sewing. Determines methods and procedures or services and assigns tasks to workers according to extension program policies. Gathers, analyzes and distributes data concerning home economics. Examines county methods and procedures to evaluate content and effectiveness of services within district. Delivers lectures to groups, such as commercial and community organizations, and directs county ex-

tension workers to deliver lectures to publicize and promote extension service activities. Reviews personnel data and recommends personnel action, such as hiring and discharging workers and adjusting salaries. Prepares or assists in preparing activity and planning reports and directs county extension workers to prepare reports. May formulate or assist in formulating budget requests to obtain operating funds.

4. County Home-Demonstration Agent - (D. O. T. 096.128) - Instructs and advises women, primarily in rural communities, in developing programs to improve farm and family life. Lectures and demonstrates techniques in such subjects as nutrition, clothing, home management, home furnishing and child care. Visits homes to advise families on problems, such as family budgeting and home remodeling. Organizes and advises clubs, and assists in selecting and training leaders to guide group discussions and demonstrations in subjects, such as sewing and food preparation. Writes leaflets and articles and talks over radio and television to disseminate information. Participates in community activities, such as judging at rural fairs and speaking before Parent Teachers Associations. May direct 4-H Club activities.

5. 4-H Club Agent - (D. O. T. 096.128) - Organizes, directs and coordinates educational projects and activities in youth organizations known as 4-H Clubs. Recruits and trains volunteer leaders to guide program. Directs selection of educational projects. Procures and presents teaching materials, such as visual aids and literature for educational projects. Arranges for 4-H Clubs to exhibit and participate in events such as State Fair.

**CONSUMER
AND
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EDUCATION**

FOOD

A food specialist may be engaged in the development and improvement of foods through chemical analysis, in research of human nutritional needs, in institutional food service management, or in the sales promotion of food products through advertising, public relations, or consumer service positions.

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HOUSING AND HOUSEHOLD EQUIPMENT

Specialists in this area are concerned with more beautiful and efficient design and decoration of housing, the development and improvement of household equipment and products through research and testing, or the promotion of household equipment and their related products and utilities through advertising, public relations, or consumer service positions.

TEXTILE AND CLOTHING

The textile and clothing specialist is involved in the development and testing of textiles through chemical analysis, the buying and selling of textiles and clothing, sales promotion and consumer services in relation to textiles and clothing, and fashion styling and designing.

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Fash
Jour

FAMILY ECONOMICS AND HOME MANAGEMENT

This specialist is concerned with how the homemaker manages her work and how the family as a unit expends its time, energy, and money, and often gives advice on home management and family budgeting problems.

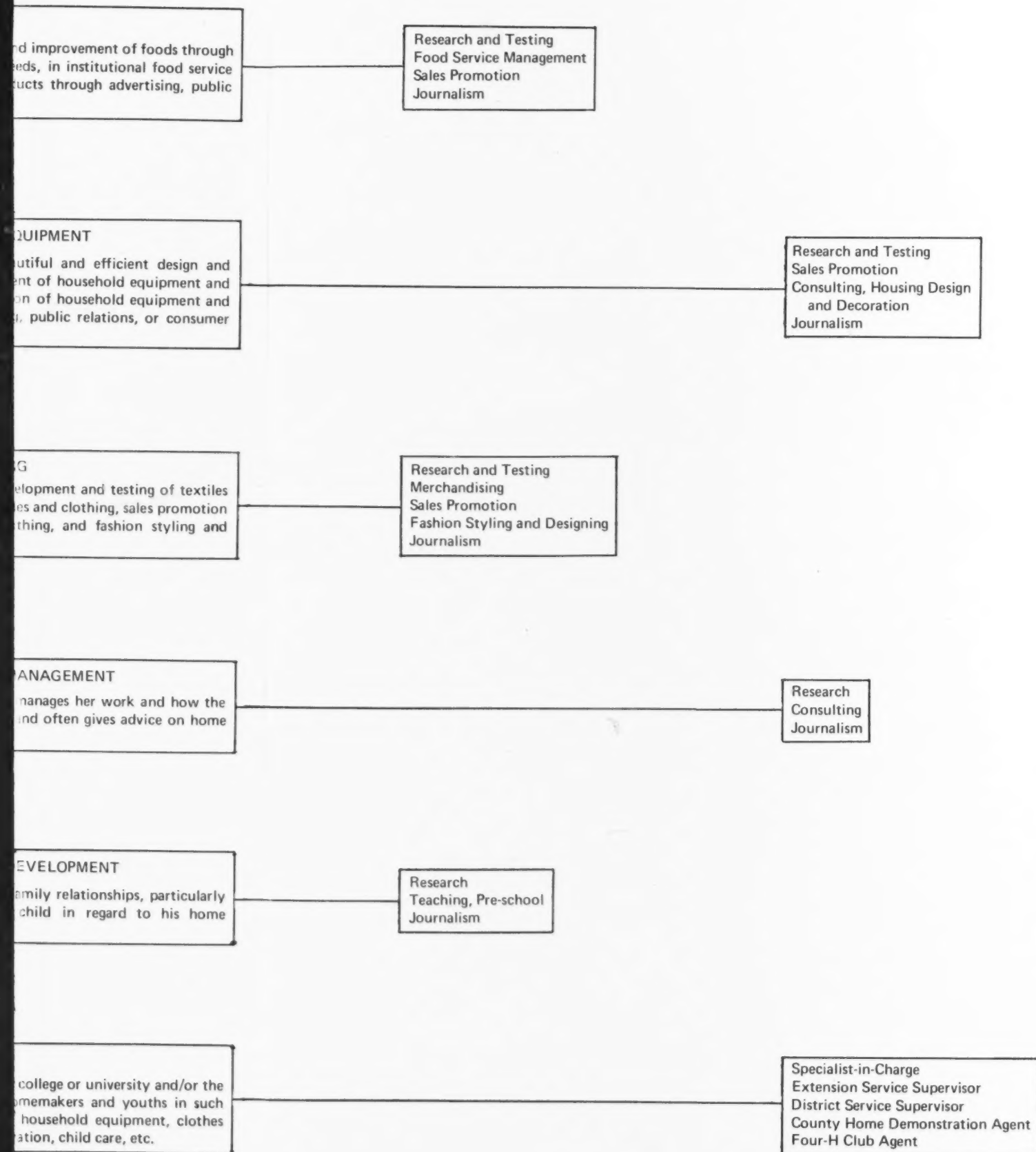
FAMILY RELATIONS AND CHILD DEVELOPMENT

Specialists in this area are concerned with all facets of family relationships, particularly the intellectual and emotional development of the child in regard to his home environment.

Rese
Teach
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EXTENSION SERVICE

The Extension Service Agent is a representative of a state college or university and/or the Department of Agriculture who educates groups of homemakers and youths in such subjects as the selection and care of textiles, clothing, household equipment, clothes construction, management of family finances, food preparation, child care, etc.



ENVIRONMENT



PREPARED BY
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ENVIRONMENT

I. INTRODUCTION

The environment is one of two major components in the area of Ecology. The other component is the organism itself. Organisms, including man, are limited in numbers as well as actions or activities by the nature of the environment.

The environment may provide too much, as well as too little, of a substance for optimum conditions. The environmentalist is concerned both with conditions as they presently exist and the preservation and maintenance of a representative amount of the natural environment. The esthetics are not possible to evaluate or measure, although these are of major importance to the environmentalist.

Most of the occupations found in this cluster (ENVIRONMENT) have developed within the past decade, i. e. since the early 1960's. Most programs for training people for these occupations have developed since 1965. The early need for people with training in environmental occupations was met by personnel from the areas of health, recreation, public service, and a few private enterprises that were concerned with the working, sanitary, and social conditions of their employees. This supply was soon exhausted, but the need continued to grow. The federal, state and local governmental demands for persons with the required qualifications gave rise to increased financial support to institutions interested in training persons with these skills.

In most cases, institutions developed this training under their technological programs; hence, these individuals are called technicians, a name commonly associated with jobs in this cluster. Many of the jobs formerly referred to as environmental management occupations, etc., are reappearing on the job market under technical-professional titles because of the new and expanding identity of the field of environmental science.

The greatest job demand at this time seems to be for persons

who are not specifically trained for a single job but are capable of working interchangeably in several areas, such as air, water or solid waste. It appears that specialized individuals are more vulnerable to technological and economic change than are others. Workers seem to prefer a broader base of skills to reduce the threat of obsolescence in the area of environmental occupations.

The technicians in the environmental cluster have been found to fall into three categories depending upon their competence levels. The first category is the Environmental Technician Aide, which is a non-degree category and employs skills such as collecting, monitoring, recording and reporting data. The second category also does not require a degree, and it is also referred to as an Environmental Technician Aide, but the duties require more experience and some specialized training in analysis, operations and maintenance. The third level is the Environmental Technician. This level usually requires at least an Associate Degree. The special duties include communication skills, computational skills, and manipulative skills.

II. METHODOLOGY

The methods of research for this cluster involved a literature search of journals and ecology and environment books. The Dictionary of Occupational Titles provided the best source of information. Several research articles of recent years have resulted in a listing of the cluster families. The previous research, however, did not give a listing of occupations or a description of duties.

The occupations arising from these families are for the most part a re-definition of some of the older occupations of other clusters. Many of the old names are retained but new duties are ascribed to the occupation.

The research also involved interviews with personnel working in environmental occupations, such as at Hagerman Wildlife Refuge, Texas Department of Wildlife, etc. In addition, letters of inquiry were sent to governmental agencies. The efforts resulted in a few additional occupations.

The journals, books and documents used in the assembling of occupations of this cluster include:

Douglas, Lawrence "A College Program Based On Ecology" Phi Delta Kappan, Vol. LIII, No. 3 Nov., 1971.

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- Pratt, Arden L., "Cluster Core Curriculum for E.E.E.", Junior College Journal, Vol. 41, No. 4, Dec.-Jan., 1970.
- Donahue, Roy L., et. al. Soils, Third Edition Prentice-Hall Co., (Englewood Cliffs, N. J., 1958).
- Turk, Amos et. al. Ecology, Pollution, Environment, W. B. Saunders Co., (Philadelphia, 1972).
- U. S. Department of Labor, Dictionary of Occupational Titles, Third Edition, Vol. I and II U. S. Government Printing Office, (Washington, D. C., 1965).
- Winn, Ira J. 'The Environment of Reform', Phi Delta Kappan Vol. LIII, No. 3, Nov., 1971.

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual job families, with a listing and discussion of the function of individual occupations are listed below:

A. POLLUTION PREVENTION AND CONTROL - There is a tendency to use the terms pollution control and environmental technology interchangeably. The legislative bodies of the local, state and federal governments have enacted laws which in turn have given rise to a steady increase in the number of new occupations which are designed to enforce this legislation.

The term pollution refers to the input of undesirable and/or foreign materials into our air, water and soil. Some of the more common types of pollutants are animal wastes, domestic wastes, processing wastes, infectious substances (toxins, allergens), plant residues, sediments, plant nutrients, minerals, pesticides, radioactive materials, airborne substances, heat, noise, and light. Each of these types requires personnel to monitor, inspect, measure, and regulate the tolerable quantity. Environmentalists believe that most of these wastes can be recycled and re-used. This family deals specifically with the occupations arising from water, soil, and air pollution and the efforts to measure and control this input.

The acute effects of pollution are documented by extensive studies. The need to determine safe levels and the need to control pollution within an industry or community account for a number of new occupations. Some of these new duties are those involved in interpreting the data accumulated by monitoring, etc.

1. Air Analyst - (D.O.T. 012.281) - Using dust collectors, analyzes samples of air in industrial establishments or other work areas to determine amount of suspended foreign particles and effectiveness of control methods. May recommend remedial measures.
2. Audiologist - (D.O.T. 079.108) - Specializes in diagnostic evaluation, etc., and research related to hearing. May specialize in fields such as industrial audiology. Also see HEALTH.
3. Chemist, Water Purification - (D.O.T. 022.281) - Analyzes water in purification plant to control chemical processes which soften it or make it suitable for drinking. Analyzes water at various stages of treatment.
4. Garbage-Collection Foreman - (D.O.T. 909.138) - Supervises workers engaged in collecting garbage and other refuse and transporting to disposal plant and areas.
5. Industrial-Waste Inspector - (D.O.T. 168.287) - Inspects waste disposal facilities and investigates sources of pollutants in municipal sewage to insure conformance with ordinance and permit requirements. Extracts samples of waste from sewer, storm drains, and water courses for laboratory tests.
6. Environmental Laboratory Supervisor - Supervises chemical tests required for quality control of process of product. Reviews and records results of laboratory tests. May recommend treatment or process that would result in less contamination or waste.
7. Radiation Monitor - (D.O.T. 199.187) - Monitors personnel, plant facilities, and work environment to detect radioactive contamination. Collects air samples to determine airborne radioactivity. Gives information on dangerous levels and instructs personnel in radiation safety.
8. Safety and Sanitary Inspector - (D.O.T. 168.268) - Inspects equipment and observes work activities of employees

in industrial plants for conformance to local sanitary and safety regulations. Reports unsafe and unsanitary conditions.

9. Septic-Tank Serviceman - (D.O.T. 899.887) - Cleans and repairs septic tanks. May replace drain tile to improve drainage and soil absorption of liquids.
10. Sewage-Disposal Worker - (D.O.T. 955.887) - Cleans and adjusts equipment. Collects samples of decontaminated refuse for tests.
11. Sewage Plant Attendant - (D.O.T. 955.885) - Tends pumps, conveyors, chlorinators and other equipment used to decontaminate sewage waste by settling, aeration and sludge digestion. Extracts samples and makes progress reports.
12. Sewage Plant Operator - (D.O.T. 955.782) - Operates sewage treatment, sludge processing, and disposal equipment. May extract sewage samples at various stages of treatment and perform routine laboratory tests. Checks final effluent.
13. Superintendent, Water and Sewer Systems - (D.O.T. 005.168) - Supervises installation and maintenance. Analyzes trends, such as population and industrial growth of areas. Designs plans to meet and serve community needs.
14. Supervisor, Water and Sewer Systems - (D.O.T. 184.168) - Supervises installing, maintaining, repairing, servicing, enlarging and relocating water distribution and sewage facilities. Determines feasible approach for excavating and performing repairs, using land plots topographic maps, and diagrams.
15. Yield-loss Inspector - (D.O.T. 529.307) - Takes samples from waste water, etc., for laboratory tests. Determines product's loss in processing and possible pollution. Participates in special studies. Reviews sampling methods and procedures.
16. Yield-loss and Sanitation Engineer - (D.O.T. 019.187) - Directs preventive control of insect and rodent infestations and losses of product. Investigates spillage of products.
17. Water Tender - (D.O.T. 599.885) - Tests water to determine suitability and obtains water for laboratory analysis. Adds specified chemicals to obtain desired quality.

B. DISEASE PREVENTION - There is sufficient data from research to document the claims that some food and liquid (milk, juice, etc.) producers have abused the consumer with their additives, adulterants, preservatives, and pesticides. Deficiency diseases as well as others caused by these additives have caused a growing need or demand for quality technicians. Some technicians test and attempt to justify the use of these additives by determining that they are not a disease source. In addition other technicians may check the effluent or wastes of their companies to be sure the environment is not polluted or that it does not become a source of disease.

Pests cause a great deal of damage to our environment and may cause specific diseases; hence, there is a need to control these organisms. These pests include flies, mosquitos, insects, rats, etc. Care must be taken with methods of control to insure the ecological balance of the community; also, control measures (such as pesticides) must not pollute or become a source of disease themselves. This occupational family, therefore, requires personnel with a great deal of skill and/or technological training.

1. Entomologist - (D.O.T. 041.031) - Studies insects and their relation to plant and animal life. Aids in control and elimination of harmful pests, such as Japanese beetles, fruit flies, gypsy and brown-tail moths, and forest insects, by developing new and improved insecticides and biological methods.
2. Exterminator - (D.O.T. 389.884) - Pest control man; vermin exterminator. Sprays chemical solutions or toxic gases and sets mechanical traps to kill pests that infest buildings and surrounding areas. May clean areas, sets baits, fumigate. May be called Rodent Exterminator.
3. Field Health Officer - (D.O.T. 168.168) - Conducts research to develop inspection standards. Traces persons exposed to certain disease such as venereal disease, radiation, poisoning, etc.
4. Food and Drug Inspector - (D.O.T. 168.287) - Inspects establishments where food, drugs, cosmetics, etc., are manufactured, handled, stored or sold to enforce legal standards of sanitation, purity, and grading. Collects samples of products for bacteriological and chemical laboratory analysis.

5. Food-Service Supervisor - (D.O.T. 319.138) - See CONSUMER AND HOME MAKING EDUCATION.
6. Fumigator - (D.O.T. 389.381) - Releases poisonous gas in buildings to kill termites, beetles, and vermin. Inspects infested buildings to identify vermin.
7. Fumigator, Orchard - (D.O.T. 465.884) - Kills insect pests on trees by treatment with hydrocyanic gas. Exposes each tree to gas for specified period.
8. Scout - (D.O.T. 465-381) - Pest control worker. Locates and exterminates plant and tree pests and diseases. Marks infested area for treatment.
9. Industrial-Health Engineer - (D.O.T. 012.188) - Plans industrial health program requiring application of engineering principles and technology to analyze and control conditions contributing to occupational hazards and disease.
10. Industrial Hygienist - (D.O.T. 779.188) - Conducts health program to eliminate or control occupational health hazards and diseases. Collects samples of dust, gases, vapors, and other potentially toxic materials for analysis. Performs sound level evaluations to determine relationship of noise to employee discomfort and efficiency.
11. Microbiologist (Food) - (D.O.T. 041.081) - Investigates activities of micro-organisms in manufacture, spoilage, and deterioration of food other than milk products. Determines source of contamination.
12. Milk Sampler - (D.O.T. 379.887) - Collects milk samples and ships for laboratory analysis.
13. Pest Control Technician (Pest Control Representative) - (D.O.T. 299.287) - Inspects buildings, writes reports, estimates numbers, and prepares and submits bids for control. See Exterminator, Scout this pamphlet.
14. Plant Pathologist - (D.O.T. 041.081) - Conducts research into nature, cause, and control of plant diseases and decay of plant products. Isolates disease-causing organisms. Tests control measures. Studies effects of soils, climate, and geography on outbreaks of plant diseases.
15. Plant-Quarantine Inspector (Agricultural Commodity Grader) - (D.O.T. 168.287) - Enforces quarantine and regulatory

laws to prevent spread of plant diseases. Examines incoming shipments on vessels from foreign countries to prevent admission of diseased plants.

16. Public Health Bacteriologist - (D.O.T. 041.281) - Conducts experiments to detect presence of harmful or pathogenic bacteria in water, food supply, or general environment of community and to control or eliminate sources of possible pollution or contagion.

17. Sanitarian - (D.O.T. 079.118) - Plans, develops and executes environmental health programs. Determines and sets health and sanitary standards and enforces regulations concerned with food processing and serving, collection and disposal of solid wastes, sewage treatment and disposal, plumbing, vector control, recreational areas, hospital and other institutions, noise, ventilation, air pollution, radiation and other areas.

18. Sanitary Inspector - (D.O.T. 168.287) - Investigates public and private establishments, such as restaurants, hotels, homes, etc. and places of public gatherings to determine compliance with or violation of sanitation laws and regulations.

C. ENVIRONMENTAL PLANNING - Predictions dealing with the potential population growth must take into account the inter-relationship of man and his environment. These predictions of future needs must account for all living things. We must not only think of the world's population growing beyond the point of insufficient food, air, water, or room to stand in, but we must also expect a decrease in health and nutritional value. These deficiencies would result in areas of poverty and overcrowding.

As the environment changes, an organism may adapt, migrate, or die. As organisms become extinct, they are replaced by other species. Man at this time is adapting. One means of adapting is to have environmental planning.

In any growing industrial community, there must be people who make decisions dealing with proper land use. These specialists must look at both the present environment as well as future needs and uses. Scenic parks and desirable landscapes must be provided for recreational use and enjoyment. Urban planning for building and moving traffic with the least amount of congestion, while providing a desirable environment requires technicians with foresight as well as insight.

Most of the occupations arising from this family are either governmental or positions with private consultant firms which require a high degree of practical experience and/or training.

1. Camp-Ground Caretaker - (D.O.T. 407.887) - Keeps national forest camping grounds clean, disposes of garbage paper, litter, and advises campers concerning regulations.
2. Construction Engineer - (D.O.T. 005.081) - Plans and designs structures to specifications. Oversees erection of buildings, bridges, etc. Also see CONSTRUCTION.
3. Geographer - (D.O.T. 029.088) - Studies nature and use of areas of earth's surface, relating and interpreting interactions of physical (physics, geology, meteorology, biology) and climatic aspects of a community. May advise on economic exploitation of a community and determine ethnic and natural boundaries. Also see PUBLIC SERVICES.
4. Landscape Architect - (D.O.T. 019.081) - See AGRI-BUSINESS AND NATURAL RESOURCES).
5. Land-Use Technician - (D.O.T. 168.168) - Investigates complaints of violations in municipal or regional land use and zoning regulations.
6. Sanitary Engineer - (D.O.T. 005.081) - Designs and oversees construction and operation of hygienic projects, such as waterworks sewage, garbage and trash disposal plants, drainage systems, and insect and rodent control projects. Plans development of watersheds. Oversees swamp drainage and insect spraying. Directs workers in sewage disposal plants. Inspects and regulates sanitary conditions of public places, such as markets, parks, and camps.
7. Statistician, Biological and Agricultural Science - (D.O.T. 020.188) - Plans and conducts surveys and experiments to obtain statistics for use in fields of basic scientific research related to life processes of plants, animals, and humans. May assist in research and public health programs.
8. Traffic Engineer - (D.O.T. 019.138) - See TRANSPORTATION.
9. Urban Planner - (D.O.T. 199.168) - Develops comprehensive plans and programs for utilization of land and physical facilities of cities, counties, and metropolitan areas.

Advises about land-use. Recommends governmental measures affecting land use.

10. Weed-Control Supervisor - (D.O.T. 096.168) - Directs state supported programs to control weeds in assigned district. Advises land owners on techniques. Prepares reports on eradication.

D. RESOURCE CONTROL - Natural events, such as earthquakes, floods, and fires can and do cause changes in the ecosystem over a long period of time, but man has the destructive ability to alter the face of the earth in only a few years. Man's first significant earth-changing endeavor was agriculture. Consumption and production of nutrients are cyclic processes. However, there are some resources that cannot be replaced at the rate at which they are used, such as coal, petroleum and mineral resources. This gives rise to many problems and therefore new occupations in resource control.

The occupations included in this family have been in existence for a longer period of time than those of any other family. Thus, fish, wildlife, and forestry technology are well developed, and the occupations connected with these overlap, as do soil and water conservation with the AGRI-BUSINESS AND NATURAL RESOURCES cluster.

The environmentalist is concerned with conservation, not as a means of making money, but as a means of preserving our resources for beauty, recreation, and tourism as well as maintaining ecological equilibrium. Most occupations in the Resource Control family are those which regulate land use and in maintenance of the environment and in the enforcement of laws governing the use of our resources.

The newer occupations of this family, such as the Forest Ecologist include providing suitable recreational areas and maintaining sanitary conditions, such as controlling pollution during continual use. Obviously, these occupations are closely related to those in the HOSPITALITY AND RECREATION cluster.

1. Animal Ecologist (Zoologist) - (D.O.T. 041.081) - Studies effects of various environmental influences on distribution, physical characteristics, behavior and life history of animals. Studies lower case environmental factors such as plant growth, rainfall, temperature altitude, and sunlight in relation to animal life.

2. Aquatic Biologist - (D.O.T. 041.081) - Studies plants and animals living in water and the environmental conditions affecting them. Investigates physical conditions to determine their relationship to aquatic life. Also see MARINE SCIENCE.
3. Commissioner, Conservation of Resources - (D.O.T. 188.118) - Directs conservation of natural resources within the state. Initiates conservation programs. Establishes standards for resource depletion. Implements rehabilitation programs for workers affected by changing technology.
4. Ecologist - A term applied to persons who study plants or animals in relation to effect of environmental influences such as rainfall, temperature, altitude, and kind and quantity of food.
5. Engineer, Soils - (D.O.T. 024.181) - Oversees and participates in field and laboratory tests of soils to determine their properties. Inspects proposed construction sites to determine general type, classification, and characteristics of soils. Reviews and prepares reports of test results.
6. Federal Aid Coordinator - (D.O.T. 188.168) - Directs disbursement of federal funds and administration of federal projects to implement Fish and Wildlife problems and needs. Authorizes establishment of conservation programs.
7. Fire Lookout - (D.O.T. 441.168) - Observes, locates, and reports forest fires and weather phenomena from remote fire lookout station. Serves as public contact at station and promotes fire prevention program. Also see AGRI-BUSINESS AND NATURAL RESOURCES.
8. Fire Patrolman - (D.O.T. 441.687) - Patrols assigned area of forest to locate and report fires and hazardous conditions and to insure compliance with fire regulations by travelers and campers. May participate in search for lost travelers or campers.
9. Fire Warden - (D.O.T. 441.168) - Supervises and coordinates activities of workers engaged in forest fire prevention and control. Inspects forest, logging, and mill areas for fire hazards. Enforces state and federal fire regulations. Dispatches personnel and equipment to fires. May restrict public recreation use of forest area during fire season.

10. Forester - (D.O.T. 040.081) - Manages and develops forest lands and their resources for economic and recreational purposes. Plans campsites and recreational centers. Assists in projects for control of floods, soil erosion, tree diseases, and insect pests in forest. Also see AGRI-BUSINESS AND NATURAL RESOURCES.
11. High Climber - (D.O.T. 949.781) - Climbs trees, inspects top for defects, rot, splits, deadwood. Installs equipment for yarding. Also called Topper, Rigger, Squirrel Man.
12. Forester Aid - (D.O.T. 441.384) - Works to inventory, protect, and re-forest timber lands by observing, measuring, and recording forest data such as temperature, waterflow, burn and cut off areas. Participates in enforcement of recreation regulations such as parking, sanitation, campfires, etc. Also see AGRI-BUSINESS AND NATURAL RESOURCES.
13. Forest Ecologist - (D.O.T. 040.081) - Conducts research in environmental factors affecting forests. Studies conditions suited for best plant growth. Investigates adaptability to environmental conditions such as changes in soil type, climate, and altitude.
14. Forest Engineer - (D.O.T. 005.187) - Performs engineering duties concerned with removal of logs from timber area. Designs and oversees construction of campsites, loading docks, bridges, water and sewage system maintenance, etc.
15. Forest-Fire Fighter - (D.O.T. 441.887) - Suppresses forest fires by felling trees, digging trenches, using ax, etc. Patrols burned area after fire to watch for hot spots that may re-start fire. May cut brush, clear ground litter, and ignite back fire to hasten burnout of major fire within contained area and to prevent its spread across firelines. Also see AGRI-BUSINESS AND NATURAL RESOURCES.
16. Gamekeeper - (D.O.T. 451.181) - Breeds, raises and protects game animals and birds on state game farms or private game preserves. Traps noxious animals and birds that may prey upon or carry disease to charges. Liberates birds and animals in designated areas.

17. Hydraulic Engineer - (D.O.T. 005.081) - Designs and oversees construction of power irrigation, and navigation projects for control and use of water. May direct construction of dams, canals and ditches according to type of soil, climatic characteristics, water supply, etc.

18. Surveyor - (D.O.T. 018.188) - See CONSTRUCTION.

19. Mining Engineer - (D.O.T. 010.081) - Determines location and plans extraction of ore, minerals etc.. Plans locations and development of shafts, tunnels, etc. Plans and coordinates utilization of manpower and equipment consistent with efficiency, safety, and environmental conditions. Also see AGRI-BUSINESS AND NATURAL RESOURCES.

20. Park Foreman - (D.O.T. 407.134) - Supervises and coordinates activities of workers engaged in maintenance of parks and playgrounds. Plans landscaping, transplanting, and pruning and patrols parks to guard against vandalism and destruction.

21. Park Naturalist - (D.O.T. 099.228) - Participates in park surveys of forest conditions and distribution, abundance, and habits of flora and fauna. Protects natural features of the park. Interviews specialists in desired fields to obtain and develop data for programs. May plan, organize and direct activities of seasonal staff members.

22. Park Ranger - (D.O.T. 169.168) - Enforces laws, regulations and policies in State and National Parks. Enforces standards of cleanliness and sanitation, patrols to prevent fires, vandalism and theft.

23. Park Superintendent - (D.O.T. 188.168) - Works for the protection, development and utilization of the park. Prepares estimates for acquiring and maintaining fish and wildlife. Investigates violations of regulations.

24. Plant Ecologist (Botanist) - (D.O.T. 041.081) - Studies effects on distribution and type of plant growth of environmental elements such as rainfall, temperature, sunlight, soil, elevation and diseases.

25. Range Manager - (D.O.T. 040.081) - Conducts research in range problems to provide sustained production of forage, livestock, and wildlife. Determines grazing seasons. Plans and directs construction and maintenance of range improvements.

26. Silviculturist - (D.O.T. 040.081) - Establishes and cares for forest stands. Manages tree nurseries and thins forest to encourage natural growth of sprouts or seedlings of desired varieties. Determines techniques for measuring and identifying trees. Also see AGRI-BUSINESS AND NATURAL RESOURCES.
27. Soil Conservationist - (D.O.T. 040.081) - Plans and develops coordinated practice for soil-erosion control, moisture conservation, and sound land use. Prepares conservation plans. Also see AGRI-BUSINESS AND NATURAL RESOURCES.
28. Soil Scientist - (D.O.T. 040.081) - Studies soil characteristics, identifies types, classifies soil, conducts experiments on farms. Makes chemical analysis of soil. Advises on soil use. Also see AGRI-BUSINESS AND NATURAL RESOURCES.
29. Sprayer (Forestry) - (D.O.T. 441.887) - Sprays forest areas with insecticides. Directs spray over trees to kill insects and other pests as well as fungal diseases.
30. Fishery Biologist - Studies the life history, habits, classification, and economic relations of aquatic organisms; manages fisheries or fishing resources; or performs research involving quantitative determination of interrelations between species of fish, the effects of natural and man-made changes of the environment on survival and growth of fish; determine rearing and planting best adapted for maximum success in hatchery operations; or devises methods to regulate fishing to secure a sustained maximum yield.
31. Game Management Agent - Enforces statutes and regulations enacted for the protection and conservation of wildlife. Acts as liason between state and federal agencies. Confers and advises concerning local conditions affecting programs under his jurisdiction.
32. Wildlife Biologist - Works in the conservation and management of wildlife or in the determination, establishment, and application of the biological facts, principles, methods, techniques, and procedures necessary for the conservation and management of wildlife.
33. Wildlife Refuge Manager - Develops management and operational plans for bird and game refuges; sees that

wildlife is properly protected; and works with individuals, organizations, and the general public on matters pertaining to refuge and related wildlife management programs.

ENVIRONMENT

POLLUTION PREVENTION AND CONTROL

Occupations in this family arise from efforts to control or prevent the input of undesirable materials into our environment.

Liquid Waste Treatment
Solid Waste Treatment a
Waste Water Treatment a
Radiation Safety Engine
Industrial Sanitation Tec
Atmospheric and Noise

DISEASE PREVENTION

Occupations in this family attempt to control organisms that cause a nutritional deficiency or disease. Control of additives and other non-patient care measures are components of this family.

ENVIRONMENTAL PLANNING

Occupations in this family include planning for future population growth and the most beneficial land-use possible.

Land Design and Use Tec
Urban and Rural Plannin
Park and Recreational C
Traffic Engineers
Industrial Environment

RESOURCE CONTROL

Occupations existing in this family include enforcing laws, maintaining the status quo, and providing more enjoyment of our natural resources.

D CONTROL
control or prevent the input of

Liquid Waste Treatment and Disposal Personnel
Solid Waste Treatment and Disposal Personnel
Waste Water Treatment and Disposal Personnel
Radiation Safety Engineers
Industrial Sanitation Technicians
Atmospheric and Noise Pollution Technicians

N
anisms that cause a nutritional
er non-patient care measures are

Parasite and Insect Control Technicians
Milk and Food Sanitation Technicians
Environmental Health Technicians
Pest Control Technicians
Water Quality Technicians

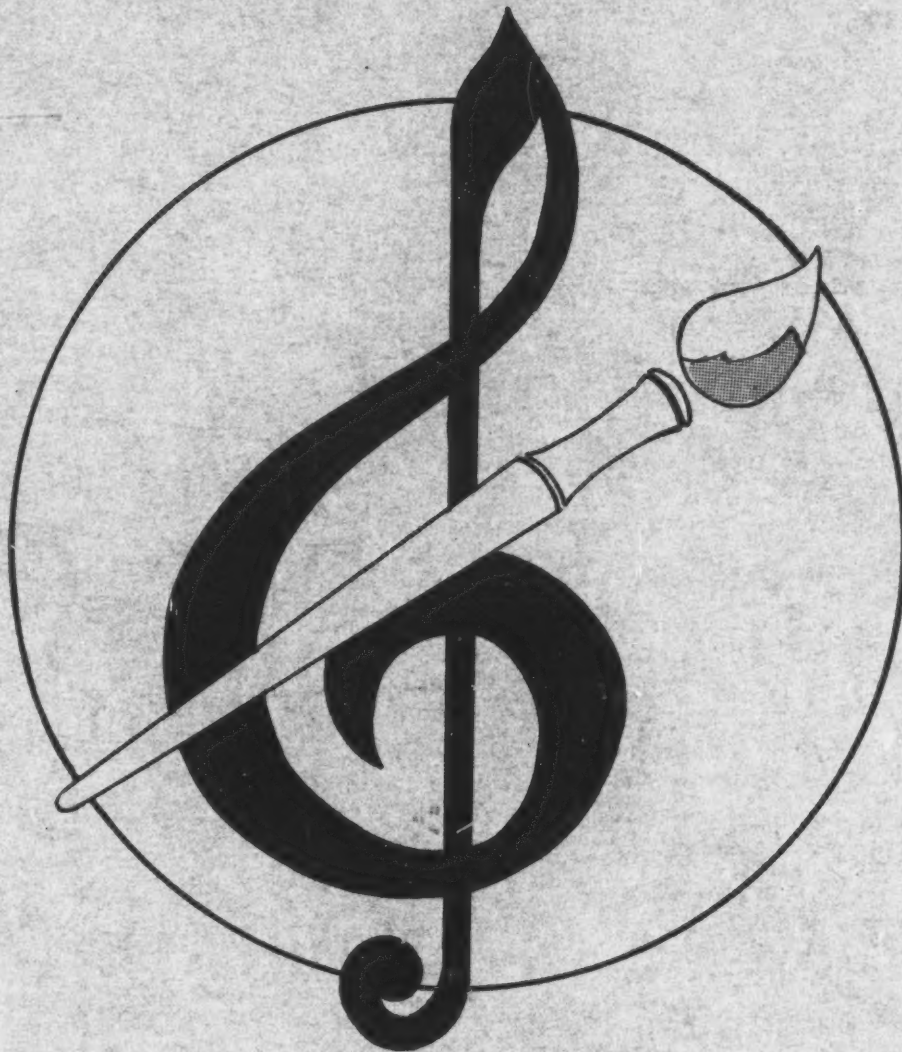
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population growth and the most

Land Design and Use Technicians
Urban and Rural Planning Consultants
Park and Recreational Consultants
Traffic Engineers
Industrial Environment Technicians

aws, maintaining the status quo,

Marine Resources Technician
Meteorology Technicians
Fisheries Resources Technicians
Recreational Resources Technicians
Water and Soil Conservation Technicians
Forestry or Timber Conservation Technicians
Plant Pest and Pesticide Control Technicians
Wildlife Management Technicians
Fire Control Technicians

FINE ARTS AND HUMANITIES



PREPARED BY
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SHERMAN/DENISON, TEXAS

FINE ARTS AND HUMANITIES

I. INTRODUCTION

The scope of the humanities encompasses those studies and activities concerned with the social, moral, and aesthetic values of a culture, and as such, is concerned with the individual -- his goals and his growth as a rational being as a responsible member of his community. The fine arts, as opposed to the applied arts, are concerned primarily with aesthetic expression. The arts strive to function as a vehicle for varied and profound expressions of thoughts and feelings, and to serve the development of man's highest technical skills. On a less lofty plane, the arts offer entertainment and diversion; in whatever realm, art directly affects the patterns and quality of contemporary life.

The classification of the FINE ARTS AND HUMANITIES as one of the fifteen occupational clusters lends a vague tone to several of its job families, in that any definition of the cluster involves education and training, rather than occupations. Descriptions of such careers as Painter, Sculptor, Draftsman, Musician and Historian are general and sometimes positively nebulous. Happily, an education in these fields may be quite compatible with industry, government, business -- many organizations which provide periodic paychecks. The fields of advertising and design give employment to numbers of artists; the television and motion picture industries keep the wolf from many a writer's, actor's or musician's door; buildings a-building require architects; government employs historians and multi-linguists; and the citizens of a nation-under-God ordain clergy.

Two fields generally considered within humane studies are philosophy and the field of jurisprudence, which enunciates the philosophical background of law. These important fields have been excluded in the job families, due to their extremely limited list of occupations. Another exclusion is that of folk art, generally considered less a livelihood or vocation than an untrained artistic expression. Many of the occupations in this cluster are intimately involved with teaching. Please refer to Education in the PUBLIC SERVICE pamphlet for this important field.

The list of job families under the FINE ARTS AND HUMANITIES cluster includes:

- A. The Visual Arts
- B. Occupations in Writing
- C. Performing Arts
- D. Architecture
- E. Religion and Theology
- F. Language and Linguistics
- G. History and Museums

II. METHODOLOGY

The main sources of information for this pamphlet are two: The Directory of Occupational Titles, Vol. I and II, 1965 edition, published by the Department of Labor; and the Occupational Outlook Handbook, published by the Bureau of Labor Statistics.

In addition, the libraries in Sherman, Texas -- Grayson County College, Austin College, and the Sherman Public Library -- furnished the following:

- Armstrong, D.R. Texas College and Career Guide. D.T. Armstrong (Houston, 1961).
- Dalrymple, Jean. Careers and Opportunities in the Theatre. E.P. Dutton and Co., Inc. (New York, 1968).
- Jones, Howard Mumford. One Great Society. Harcourt, Brace and Co. (New York, 1959).
- Peterson, Clarence E. Careers for College Graduates. Barnes and Noble, Inc. (New York, 1968).
- Terry, Walter. Careers for the '70's - Dance. Crowell, Collier Press (New York, 1971).
- Wilson, Robert N. The Arts in Society. Prentice-Hall, Inc. (New Jersey, 1964).
- The Your Future in series. Richards Rosen Press, Inc. (New York, 1961 through 1966).

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual Job Families, with a listing and discussion of the function of individual occupations, are listed below:

A. The Visual Arts - The division in the Visual Arts between the commercial artist who works on a commissioned or salaried basis, and the fine artist who must find his own market for his finished work is not a deep one. The differences, aside from the job market, are in technique and application. Both deal in picture images and symbols, as well as the elements of aesthetics, and many artist feel comfortable traveling between the two. The commercial artist is commissioned to create and execute the artwork used in advertising and illustrating, in printing and publishing, and in motion pictures, and in the technical field. Such artists also design industrial products.

1. Advertising Artist - (D.O.T. 141. series) - Most are employed as staff artist on a salaried basis by advertising agencies, art studios, and advertising departments of large companies.

a. Art Director - (D.O.T. 141.031) - Works with copywriter to produce ad concepts. Develops art aspects of the advertising plan. Supervises the agency artists, deals with clients, "buys" from free-lance artists, photographers, and art services.

b. Lay-Out Artist - (D.O.T. 141.081) - Lays out the construction of the ad in a rough sketch, determining its elements of design, composition, and color, and selecting its illustrations and/or photographs. May work up a more finished design for the client's consideration. May design layouts for newspaper, magazine, television, poster, direct mail, and billboard advertisements.

c. Renderer - (D.O.T. 970.281) - Renders drawings for display or advertising purposes, working from sketches and blueprints. May be designated according to specialization. (Renderer is also employed by architects, industrial designers, etc.).

d. Letterer - (D.O.T. 970.381) - Paints or draws precise lettering using lettering pen or brush and determining lettering design from layout sketches and instructions. May design lettering if not specified.

e. Paste-Up Artist - (D.O.T. 979.381) - Photographs prepared copy, develops negatives, and arranges and mounts illustrations and print on paper according to lay-out artist's instructions. Cuts elements of the design of the ad and fits them into space specification. Draws remainder of design.

f. Illustrator - (D.O.T. 141.081) - Executes finished illustration from sketches and cartoons. See Illustrator, A.2.a., below for more details.

g. Other Specialists - Large agencies may employ specialists and consultants such as a Cartoonist, Color Specialist, or Landscape Specialist.

2. Advertising Production Manager - (D.O.T. 141.168) - Coordinates activities of design, illustration, photography, paste-up, and typography personnel to prepare advertisements for publication and supervises workers engaged in pasting-up advertising layouts in art department or studio. Determines arrangements of art work and photographs and selects style and size of type, considering factors such as size of advertisement, design layout, sketches, and method of printing specified. Submits copy and typography instructions to printing firm or department for typesetting. Reviews proofs of printed copy for conformance to specifications. Assigns personnel to mount printed copy and illustrations on final layouts, coordinating assignments with completion of artwork to insure that schedules are maintained. Writes instructions for final margin widths and type sizes and submits layout for printing. Examines layout proofs for quality of printing and conformance to layout. In small establishments, may also perform duties of paste-up man.

a. Illustrator - (D.O.T. 141.081) - Draws and paints illustrations for advertisements, books, magazines, posters, billboards, and catalogs. Studies design layout or proposed sketch, and selects technique, such as pen and ink, watercolor, pastels, scratchboard, tempera, or oils, best suited to produce desired visual effect and to conform with printing method specified. Executes design, using selected technique and rendering details from memory, live models, manufactured products, or reference materials. May be designated according to specialization such as Advertising Illustrator, Book Illustrator, Catalog Illustrator, Magazine Illustrator, Poster Artist, Graphic Artist.

b. Medical Illustrator - (D.O.T. 141.081) - Makes sketches and constructs tri-dimensional models to illustrate surgical and medical research procedures, anatomical and pathological specimens, unusual clinical disorders, micro-organisms, and plant and animal tissues: Develops drawings, paintings, diagrams, and models illustrating medical findings for use in publications exhibits consultations, and research and teaching activities. Completes illustrations in pen and ink, monochromatic wash, watercolor, carbon dust, and mixed media. Constructs, or advises in construction of teaching models in plaster, wax, plastics, and other

materials. Devises visual aids to assist in interpreting research programs. May specialize in illustrations in a particular medical field. May specialize in drawings of plant and animal tissue and be designated as Histological Illustrator.

c. Cover Design Artist - (D.O.T. 141.081) - Designs and renders cover illustrations for publications, such as magazines, books, and phonograph record albums, based on ideas suggested by art department. Designs lettering for title copy. May be designated according to specialization such as Book-Jacket Designer, Phonograph Album Designer.

d. Colorist - (D.O.T. 022.181, 970.884, and .381) - Works as a color expert and consultant for such diverse industries as textiles and plastics, greeting cards and maps, photography, motion pictures. Develops color formulas and plans and directs activities of color shop.

e. Art Director, Retail Trade - (D.O.T. 141.031) - Designs artwork, prepares layouts, and supervises and coordinates activities of workers engaged in illustrating and laying out advertisements for newspaper publication: Confers with store executives to plan advertising program and detailed schedules, based on season, fashion trends, and current events. Plans art design and layout work, attempting to create and utilize new ways of presenting merchandise to public. Assigns work to art personnel. Purchases materials used in designing advertisements, such as engravings, cuts, and finished artwork from freelance workers. Reviews completed drawings and approves final layouts before further processing.

3. Clothes Designer - (D.O.T. 142.081) - Creates, designs, and prepares patterns for new types and styles of women's, men's, and children's wearing apparel or knitted garments: Roughly sketches outline of pattern on printed forms. Draws various parts of garment to full scale. Cuts out drawings with scissors to make pattern for experimental garment. Writes specifications for garment, describing construction, color scheme, and type of fabric to be used. Shows new styles to salesmen at style shows and shows and sales meetings. Women's Garment Designer, also called Couturier, designs custom-styled women's garments according to client's measurements and fashion preferences. May design single garment or entire wardrobe for client. When designing apparel for wear in stage productions, known as Costume Designer.

4. Fur Designer - (D.O.T. 142.281) - Makes models of fur garments, such as coats, capes, jackets, and stoles, for customers. Sketches

design on paper to make or restyle garment. Directs workers and estimates cost.

5. Garment Copyist - (D.O.T. 142.281) - Gathers information on current trends in garment styling and sketches examples of competitors' garments. Attends garment fashion shows, concerts, and other public activities, and reviews magazines and manuals for information concerning style trends, consumer preferences, and price ranges. Sketches garments to illustrate details. May design original garments.

6. Fashion Artist - (D.O.T. 141.081) - Draws figures, garments, and accessories for newspaper advertisements, determining pose suitable to emphasize selling points of apparel, and using pencil, charcoal, ink, or paints. Illustrates background and draws lettering for headlines.

7. Artists in Motion Picture Occupations - (D.O.T. 149. series) - Also see COMMUNICATIONS AND MEDIA.

a. Art Director - (D.O.T. 149.031) - Directs, coordinates, and participates in motion picture art work production concerned with design of sets, scenic effects, and costumes: Supervises interior designer and stage-set designer. Plans costuming of cast and directs work of costumers in providing apparel for cast. Refers to technical literature or consults dramatic arts historian to insure that scenes and costumes depict accurate representation of given period or location. Coordinates efforts of departments to achieve harmonious color effects in production of color films. Confers with chief electrician on lighting sets to achieve artistic or dramatic effects.

b. Cartoonist - (D.O.T. 141.081) - Draws cartoons, delineating in successive drawings action necessary to portray and dramatize animation of characters: Labels each section with designated colors when colors are used. May create and prepare sketches and model drawings of characters. May prepare successive drawings to portray wind, rain, fire, and similar effects and be designated special effects cartoonist.

c. Cartoon-Background Artist - (D.O.T. 141.081) - Develops color patterns and moods and paints background layouts for animated cartoon scenes, using water colors or oil paint. May determine colors to be used and prepare sample cards or celluloids for use as guides in painting characters.

d. Color Advisor - (D.O.T. 141.081) - Examines sketches of

cartoon characters and action sequences, evaluating them in relation to background layouts and other scenic effects, and determines colors to be used by animated cartoons painter in painting scenes. Discusses effect of color patterns and combinations to be used in scenes with cartoonist.

e. Background and Title Artist - (D.O.T. 141.081) - Draws and paints titles and title backgrounds for use in motion pictures. Sketches scenes, letters sketches, submits for approval. Renders final artwork to be photographed.

f. Inker and Opaquer - (D.O.T. 970.381) - Traces drawings prepared by Cartoonist and paints tracing to render it opaque.

8. Designer - (D.O.T. 142. series) - Researches and designs products, containers and packages, and arranges exhibits for display purposes. Field is as varied as businesses, industries, and organizations are who use artwork design. The following may serve as a beginning of a reference list.

a. Manager of Display - (D.O.T. 142.031) - Designs advertising for windows or interior use and supervises and coordinates activities of workers engaged in laying out and constructing displays: Consults with advertising and sales officials to ascertain type of merchandise to be featured and time production.

b. Commercial and Display Designer - (D.O.T. 142.081) - Creates designs of patterns and ornaments for application to articles, such as fabrics, wallpaper, ceramics, and glassware, adapting design to limitations and requirements of reproduction methods and techniques. Typically does not design form of industrial products. As display artist, will design, draw, paint, or sketch backgrounds and other fixtures made of paper, cardboard, wallboard, plaster, canvas, or wood, for use in window or interior displays. May design manikins of papier mâché or other material.

c. Interior Designer and Decorator - (D.O.T. 142.051) - Plans and designs artistic interiors for homes, hotels, ships, commercial and institutional structures, and other establishments. Analyzes functional requirements, moods, and purpose of furnishing interior, based on client's needs and preferences. Devises harmonious color scheme and sketches plans of rooms showing arrangement of furniture and accessories. Estimates cost and amount of materials required and presents plans to client for approval. Selects and purchases decorative and functional materials and accessories, such as furniture, lighting fixtures, and pictures, or

creates original designs for furnishings to conform with decorative scheme. Directs workers painting wall, laying carpets, installing fixtures and draperies, and arranging furniture and accessories in position.

9. Product and Package Designers - (D.O.T. 142.081) - Also see MARKETING AND DISTRIBUTION.

a. Bank-Note Designer - Designs engraving plate for printing government securities, such as currency, stamps, and bonds, according to preliminary drawings and knowledge of engraving and printing techniques. Introduces design elements to discourage counterfeiting. Confers with representatives of issuing agency to obtain design approval. May originate designs and design suggestions for securities of employing agency.

b. Cloth Designer - Originates designs for fabrication of textile cloth, specifying weave pattern, color, and gage of thread, to create new fabrics that meet functional requirements and fashion preferences of consumers. Develops new ideas for fabrics through study of fashion trends and knowledge of textiles and their various uses. Consults with technical and merchandising staff to obtain design ideas. Sketches designs for patterns on graph paper, using watercolors, brushes, pens, and rulers, and prepares written instructions to specify such details as construction of fabric, finish to be applied, and color to be used.

c. Embroidery Designer - Creates decorative designs to be embroidered on fabrics. Draws full-scale design on paper. Transfers by perforator to paper pattern by rubbing piece of red marking wax over perforations in design.

d. Furniture Designer - Designs furniture line or individual pieces for manufacture, according to design trends, offerings of competition, production costs, and characteristics of company's traditional market.

e. Handbag Designer - Originates and modifies designs for ladies' handbags and makes patterns and samples.

f. Hat Designer - Designs caps, hats, or millinery, copies or modifies existing designs, draws and cuts out master patterns, and makes sample articles.

g. Industrial Designer - Designs form of products to be manufactured and associated packaging and trademarks. Sketches design

of products such as furniture, lamps, motor vehicles, radio cabinets, and household appliances. Also see MANUFACTURING.

h. Jewelry and Flatware Designer - Creates original designs and modifies existing designs of jewelry and flatware articles. Design specifications will include type of metal, location of engraving and jewels. Reproduces original designs in wax, prepares design specifications, and computes production costs. May create original jewelry designs.

i. Novelties Designer - Designs items to be manufactured from plastics such as combs, toys, housewares, and draws designs to guide modelmaker.

j. Ornamental Metalwork Designer - Designs ornamental metal items such as grills, lattice work, statuary, railings, displays, plaques and light fixtures, and tooling for their fabrication. Builds products from original design or working models.

k. Package Designer - Designs containers for products such as foods, beverages, toiletries, cigarettes, and medicines. Renders design including exterior markings and labels, and fabricates model.

l. Pottery Decoration Designer - Originates drawings of patterns in decorating pottery and porcelain ware. Paints design on bisque ware and applies underglaze.

m. Shoe Designer - Creates original designs for shoes and modifies existing designs. May cut paper patterns of shoe design, and make cardboard templates or metal or wooden patterns. May prepare charts, diagrams, or sketches to illustrate design.

n. Sign Designer - Designs illuminated and electric signs. Draws design for sign, showing background, color arrangement, and other details.

o. Stained Glass Window Designer - Creates designs for stained-glass windows, utilizing knowledge of portraiture, styles, church symbolism, and heraldry to plan design. May create color design in miniature for client's approval. Prepares full-size detailed drawing. Draws in and shades details of face, figure, folds of draperies, and ornaments. Draws in bars and divisions to indicate where glass will be cut and leaded.

p. Tile Designer - Designs individual tiles and lays out designs for tile walls and floors.

q. Toy Designer - Designs electronic, electrically operated, mechanical, and non-mechanical toys. Sketches design ideas and draws working drawings. Designs and fashions stuffed toys according to original ideas and photographs or drawings. Selects color and fabric, sews together and applies facial features.

r. Wallpaper Artist - (D.O.T. 141.281) - Devises and paints color schemes on designed wallpaper samples and lays out wall-designs on positive for reproduction on screen. Mixes pigments to obtain paints of various colors and shadings. Devises color schemes for wallpaper and paints color schemes on wallpaper samples.

10. Painting and Sculpting - (D.O.T. 144. and 148. series)

a. Painter - (D.O.T. 144.081) - Creates works of aesthetic import by the skilled application of paint to a surface or ground. The principal accepted mediums for the painter are oil, tempera, watercolor, gouache, pastel, polymer, encaustic, and fresco. May be designated according to subject or style, such as Painter of fresco, miniatures, murals, portraits, landscapes, and realist, impressionist, pop and op, hard-edge. Scenic Artist in motion pictures paints scenery, back drops, and other parts of motion picture sets.

b. Graphics Artist - (D.O.T. 141.081) - Concerned with the various multiple-replica processes by which prints are created. The principle processes are aquatint, crayon manner, drypoint, etching, line engraving, woodcut, lithography, and mezzotint. Prepares plate or screen or block, inks and runs paper through press to obtain prints. Also see Illustrator, this pamphlet.

c. Cartoonist - (D.O.T. 144.081) - Draws cartoons for publication to illustrate highlights of news topics in a satirical or humorous manner. Creates idea from news items. Confers with editor on policy. Inks in sketch and forwards to engraving department. May be designated according to type of cartoon drawn, such as editorial, sports. Cartoonist who sketches likenesses or caricatures of prominent persons, using subject or photograph is called Sketch Portraitist.

d. Paintings Restorer - (D.O.T. 144.281) - Restores damaged and faded paintings and preserves paintings, using techniques based on knowledge of art and art materials. Conducts tests on paint sample, removes discolorations and old varnish, reconstructs and blends retouched areas with original portions, relines painting with new canvas, stretches, and fills in torn portions. Resurfaces painting with varnish.

e. Sculptor - (D.O.T. 148.081) - Creates aesthetic three-dimensional forms by carving, modeling, or assembly of pre-fabricated elements. Uses stone, concrete, wood, metal, plaster, plastic. May work under commission.

f. Potter - (D.O.T. 148.081) - Throws and shapes clay on potter's wheel, or builds pots by coil or slab method. Glazes and fires pots in kiln.

11. Photographer - (D.O.T. 143. series) - Photography involves the art or process of producing images of objects upon a photosensitive surface by the chemical action of light or other radiant energy. The purposes to which it is put determines whether it will be considered an art, a private service, a hobby, or a tool to be used by industry, science, communications, or business.

a. Commercial Photographer - (D.O.T. 143.062) - Still cameraman. Photographs persons, motion-picture sets, merchandise, exteriors and interiors, machinery, and fashions to be used in advertising and selling. Arranges equipment and setting. Develops film, enlarges, reduces, and intensifies prints. May take portraits. Apprentice learns while performing duties for photographer. Assists in taking pictures and in darkroom chores.

b. Portrait Photographer - (D.O.T. 143.062) - Photographs persons and makes photographic negatives from which prints can be developed, using studio-type camera. Arranges equipment and background, and poses subject. Develops prints in darkroom.

c. Photograph Gallery or Studio Manager - (D.O.T. 143.062) - Maintains a studio in which he displays pictures and frames of various sizes and styles for sale.

d. Motion Picture Photographer - (D.O.T. 143. series) - See COMMUNICATIONS AND MEDIA.

e. News Photographer - (D.O.T. 143.062) - Photographs news events or people for use in illustrating news stories and articles. Travels to assignment location to take pictures and returns to newspaper office to develop prints. Frequently specialized in one branch of work, such as news, sports, special features, portraits. Also see COMMUNICATIONS AND MEDIA.

f. Television Cameraman - (D.O.T. 143. series) - See COMMUNICATION AND MEDIA.

- g. Scientific Photographer - (D.O.T. 143.282) - Photographs plant and animal tissues and microscopic specimens of food, oil, metal, and other products and develops negatives to provide pictures illustrating industrial and scientific processes and phenomena. May act as consultant to organizations in such fields as aerodynamics, ballistics, engineering and metallurgy. May specialize in a field such as biology and photograph medical, biological, and allied phenomena to provide illustrations for scientific publications, records, and research and teaching activities. Makes still and motion picture reproductions of patients, anatomical structures, microscopic specimens, tissues, and pathological processes. Makes copies of X-rays and similar materials, utilizing photographic techniques, such as time-lapse and ultraspeed pictures, and ultraviolet or infrared light. Engages in research activities. May design special equipment and processing formulas.
- h. Aerial Photographer and Interpreter - (D.O.T. 143.382 and 029.188) - Takes and analyzes aerial photographs for military, industrial, or topographical data.
- i. Finish Photographer - (D.O.T. 143.382) - Operates photographic equipment to photograph and develop pictures of horse-race finish at racetrack. Prints and enlarges photographs.
- j. Identification Bureau Photographer - (D.O.T. 143.382) - May be designated Police Photographer. Photographs persons suspected or convicted of crimes for identification purposes. Photographs scene of crimes to prepare photographic record of perishable evidence for prosecuting case. May develop, print, and enlarge negatives.
- k. Camera Girl - (D.O.T. 143.858) - Persuades nightclub and restaurant patrons to pose for photographs, and operates camera. Returns camera to darkroom where Darkroom Man processes film. Returns photograph to patrons and collects money.
- l. Photomachine Operator - (D.O.T. 143.867) - Photographs patrons, using prefocused camera, to take series of miniature pictures. May enlarge pictures or tint with oils.
- m. Street Photographer - (D.O.T. 143.858) - Photographs passers-by on street, and persuades them to buy snapshots. Collects payment and arranges for delivery of photographs.
12. Draftsman - (D.O.T. 011 through 019) - The draftsman translates the ideas, rough sketches, specifications, and calculations of engineers,

architects, and designers into complete and accurate working plans which are used by skilled craftsmen in making a product or in building a structure. Draftsmen may make calculations concerning the strength, reliability, and cost of materials, and check dimensions of parts and their relationship to each other. Through their drawings and specifications, they describe exactly what materials and processes skilled craftsmen are to use on a particular job. The draftsman uses such instruments as compasses, dividers, protractors, and triangles. The draftsman is categorized according to the field in which he works—mechanical, electrical, electronic, aeronautical, structural, or architectural drafting. Also see CONSTRUCTION.

B. OCCUPATIONS IN WRITING - The writer, like the historian, imposes order upon disorder, and achieves understanding through form and ideas. For the student who is gifted with an ability to express ideas in writing, a career as a writer offers a varied and at times exciting livelihood. The writer is directly dependent on the printing and publishing world, but as in the case of artists, he may travel with ease between writing in a literary sense and writing commercially.

1. Literary Writer or Author - (D.O.T. 130.088) - Creates original works of literature for publication as a book or magazine article. May specialize in such areas as fiction or nonfiction. May write on assignment or submit unassigned article for publication. May be designated according to type of writing done, such as Novelist, Short-Story Writer, Essayist. Essayist writes descriptive or critical literary interpretations or analyses, choosing as subject matter such fields as politics, social conditions, theology, or drama, in which he is qualified by knowledge, experience, or research.

2. Playwright - (D.O.T. 131.088) - Dramatist - writes original plays such as tragedies, comedies, or dramas, or adapts themes from fictional, historical, or narrative sources, for dramatic presentation.

a. Scenario Writer - (D.O.T. 131.088) - See COMMUNICATIONS AND MEDIA.

b. Script Writer - (D.O.T. 131.088) - See COMMUNICATIONS AND MEDIA.

3. Poet - (D.O.T. 130.088) - Composes narrative, dramatic, or lyric poetry, usually on free-lance basis, for publication, choosing own subject matter and suitable form to express personal feeling and individual experience, or to narrate story or event. May write doggerel or other verse about specified themes for special assignments or for syndicated columns.

4. Lyricist - (D.O.T. 130.088) - See COMMUNICATIONS AND MEDIA.
5. Technical Writer - (D.O.T. 139.288) - Writes in clear and concise language service manuals and related technical publications concerned with installation, operation, and maintenance of electronic, electrical, mechanical, and other equipment.
6. Copy Writer - (D.O.T. 132.088) - Puts on paper the first words of ad. Writes original copy for newspapers, magazines, billboards, and transportation advertising. Writes scripts for radio and television advertising. Consults with account executive and media and marketing representatives.
7. Collaborator - (D.O.T. 139.088) - Collaborates in writing plays for cinema, television, or theatrical productions, or in writing books, articles, or other literary productions, as member of writing team. When altering scripts by eliminating unnecessary action, changing sequence or characterizations to make screenplay or teleplay suitable for production is known as Rewrite Man. When assigned to final editing of script by brightening dialogue, cutting length, or accelerating tempo, is known as Polisher.
8. Cross-Word Puzzle Writer - (D.O.T. 139.088) - See COMMUNICATIONS AND MEDIA.
9. Greeting Card Editor - (D.O.T. 139.008) - See COMMUNICATIONS AND MEDIA.
10. Humorist - (D.O.T. 139.008) - Writes humorous articles for publication, choosing own subject matter, or writing humor on particular subject for specific occasion. May specialize in writing comedy shows for radio and television presentation and be designated Comedy Writer.
11. Lexicographer - (D.O.T. 132.088) - Compiles dictionaries by determining origin, meaning, and pronunciation of words and writing their definitions for inclusion in dictionary.
12. Critic - (D.O.T. 032.088) - See COMMUNICATION AND MEDIA.
13. Technical and Scientific Publications Manager - (D.O.T. 132.081) - Directs editorial and publishing policies of technical and scientific publications and supervises staff engaged in preparation, editing, and production. May coordinate activities of staff engaged in research programs and publish research findings and results.

C. THE PERFORMING ARTS - The performing arts include the dance, drama and music. The attraction of careers in these fields is so great that the number of first-rate artists seeking employment is far greater than the number of full-time jobs available, and as a result, many must supplement their incomes with part-time employment. Training generally starts at an early age, and becomes intensive in the early teens. Performers need not only natural talent and years of training, but an overwhelming interest in their field.

1. The Dance - Dance as an art form in the United States left its stepchild status behind in the early 1900's with the careers of Isadora Duncan, Ruth St. Denis, and Pavlova. Today, ballet finds housing in about a hundred resident companies; musical theatre is big business, and television and motion pictures provide careers for the dancer.

a. Choreographer - (D.O.T. 151.028) - Creates original dances for ballet performance, musical show, or revue to be performed on stage, on television, in motion pictures, or in nightclubs, and instructs performers. Originates choreography designed to suit subjects, suggest story, interpret emotion, or enliven musical show, coordinating dance with music to produce desired effect. Develops dance routines or ballet formations for chorus ensemble or corps de ballet. Trains and rehearses members of chorus and individual performers in dance. May direct and stage dance presentation. May be known as Dance Director.

b. Dancer - (D.O.T. 151.048) - Performs dances alone, with partner, or in groups, such as corps de ballet or chorus ensemble, to entertain audience. Performs classical, modern, or acrobatic dances, coordinating body movements and facial expressions with musical accompaniment to express theme of dance. Rehearses dance routines developed by Choreographer. May perform original dances. May sing and provide other forms of entertainment. May specialize in particular style of dancing and be designated according to specialty such as Acrobatic Dancer, Ballet Dancer, Ballroom Dancer, Chorus Dancer, Interpretative Dancer, or Tap Dancer.

2. The Theatre - The magic of the theatre affords its participants a fascinating and rewarding career. It does, however, take talent, training, and an inner core of confidence and determination to pursue a successful career. There were, in 1968, about 14,000 actors in the United States, working in television, radio, motion pictures, and on the stage. New York and the large cities offer the greatest concentration of opportunities, but the more than one hundred summer stock companies, and the growth of the regional repertoire theatre, industrial theatre, and dinner theatres provide opportunities for a professional career close at hand.

- a. Stage Director - (D.O.T. 150.028) - Interprets play scripts for stage presentation, and instructs Actors in interpretation of individual roles. Confers with Producer about production plans and script, and assists in selection of cast. Explains production plans to cast and stage crew. Discusses script changes with Playwright. Approves scenery design, sound and lighting effects, costumes, make-up, and choreography. Conducts rehearsals, instructing performers in interpretation of script until roles are mastered. Duties of Stage Director end when production is ready for indefinite run.
- b. Stage Manager - (D.O.T. 964.138) - Takes over routine management of daily stage performances when duties of Stage Director are at an end. Until then, functions as assistant to Stage Director, and liaison to backstage personnel. Supervises activities of stage crew and coordinates production plans. Arranges conference times for cast, crew, and Stage Director, and disseminates general information about production. Calls performers at specified intervals before curtain time. Reads script during each performance and gives cues for curtain, lights, sound effects, and prompters. Interprets stage-set diagrams to determine stage layout. Supervises stage crew engaged in placing scenery and properties. Devises emergency substitutes for stage equipment or properties. Supervises activities of one or more assistants. Rehearses replacement performers, and sees that production continues as rehearsed with Stage Director.
- c. Theatre Manager - (D.O.T. 187.168) - Manages theatre for stage productions. Coordinates and supervises activities of personnel to insure efficient operation and to promote patronage of theatre. Directs workers in making alterations to and repair of building. Manages financial business of theatre. Requisitions or purchases supplies.
- d. Public Relations Director - (D.O.T. 165.068) - Plans and conducts publicity programs for theatre through such media as magazines, newspapers, radio, and television. Also see PUBLIC SERVICES.
- e. Dramatic Arts Historian - (D.O.T. 052.088) - See Historian, this pamphlet.
- f. Playwright - (D.O.T. 131.088) - See Occupations in Writing, this pamphlet.
- g. Stage-Scenery Designer - (D.O.T. 142.081) - Designs sets

for theatrical productions: Studies period of architecture and decoration which represents time of play. Sketches and paints plans. Presents plans to Stage Director and Producer for approval. Build miniature sets in cardboard, plaster, or sponge. Prepares working drawings showing elevation and plan of stage in detail for scene builders. May designate size and oversee building of furniture and setting according to miniature set. May create special stage lighting to achieve dramatic or decorative effects, or works with Lighting Director. In experimental theatres, plans stage sets for mobility, interchangeability, and economy in accord with budget limitations.

h. Costume Designer - (D.O.T. 142.081) - Designs costumes for theatre productions. Studies script and characters. Designs costumes according to style of period, economic and social status of characters portrayed and mobility of character. Confers with Set Designer to coordinate costumes and color with set design.

i. Costume Mistress - (D.O.T. 969.261) - Fits costumes to members of cast and makes minor alterations and repairs. May press and spot-clean costumes. May purchase or rent costumes and other wardrobe accessories. Also see COMMUNICATIONS AND MEDIA.

j. Drama Critic - (D.O.T. 032.088) - See COMMUNICATIONS AND MEDIA.

k. Dramatic Coach - (D.O.T. 150.028) - Coaches amateur or professional performers in drama techniques. Conducts impromptu readings to evaluate performer's abilities. Adapts suitable training methods based on professional competence of performer. Instructs and drills performer in camera or stage techniques, script analysis, characterization, vocal techniques, and interpretation of role in dramatic productions. Advises performer regarding basic wardrobe, grooming, and manner to prepare him for professional contacts. Teaches correct methods and techniques in preparing for impromptu readings and in auditioning for specific parts in plays. May be known according to field of specialization such as Screen Coach, Theatre Coach.

l. Actor - (D.O.T. 150.048) - Portrays role in dramatic production to interpret character or present characterization to audience. Rehearses part, learning lines and cues as directed. Interprets comic or serious parts by speech and gesture. May sing and dance. May specialize in portraying particular type of part and be designated Character Actor, Juvenile, Leading Man, Actress, Character Actress, Ingenue, or Leading Lady.

m. Dramatic Reader - (D.O.T. 150.048) - Entertains audiences by reading and interpreting roles to portray different characters and adapts writings, such as plays, letters, articles, or stories, into one cohesive presentation. Plans staging and approves costumes. Memorizes script and interprets all roles, relying mainly on changes of voice and inflection to hold audience's attention. Act with minimum number of stage properties, using book or script for effect. Performs alone or with one or more Dramatic Readers.

n. Story Teller - (D.O.T. 150.048) - Reads or retells stories selected for storytelling programs in libraries, schools, playgrounds, and story hours on radio and television, to introduce children to literature.

o. Property Foreman - (D.O.T. 964.168) - Provides stage properties for theatrical production. Purchases or rents properties from merchants and museums or obtains them from theatre or warehouse. Arranges with Prop Maker for construction of period furniture and properties. Arranges properties on stage for each scene. Clears or directs clearing of properties from stage at conclusion of each scene. When accompanying show on tour, packs and unpacks properties. May arrange transportation of properties.

p. Flyman - (D.O.T. 964.887) - Lowers or raises scenery and curtains by pulling ropes from position above or to one side of stage. May also move scenery on stage. Follows cue sheet or bell or light signals to make required changes during performance.

q. Stage Electrician - (D.O.T. 824.381) - Installs electrical equipment and lights used on stage, and operates switchboard to supply stage with electrical and lighting effects, following cue sheet. Prepares cue sheet to determine lighting effect required by script or Stage Director, or Lighting Director. Places spotlights and floodlights backstage to illuminate stage. Places color frames on lights to obtain colored effects. Sets up other electrical equipment, such as microphones, bells, or buzzers for sound effects. Operates switchboard to control stage and house lights and other electrical equipment backstage required by script.

3. Music - Professional musicians require many years of study and intensive practice, whether they play in a symphony orchestra, jazz combo, sing, or compose. The fields which employ musicians are many and varied. Musicians trained in classical music play for orchestras, opera, solo, and as accompanists. Those who specialize

in popular music may work with a dance band, in night clubs and restaurants. The theatre, television, and radio offer employment, but the largest number of musicians either supplement their incomes, or work full-time, as teachers.

- a. Composer - (D.O.T. 152.088) - Creates and writes musical compositions. Invents melodic, harmonic, and rhythmic structures to express ideas musically within circumscribed musical form, such as symphony, sonata, or opera. Translates melodies, harmonies, and rhythms into musical notes and records notes on scored music paper. Arranger transcribes musical compositions or melodic lines to adapt them to or to create particular style for orchestra, band, choral group, or individual. Orchestrator writes score for orchestra, band, choral group, or individual, changing music from one medium to another, or one voice to another.
- b. Conductor - (D.O.T. 152.048) - Conducts instrumental music groups, such as orchestras and dance bands. Auditions and selects members of group. Selects music to accommodate talents and abilities of group and to suit type of performance to be given. Directs group at rehearsals and performances. May transcribe musical compositions and melodic lines to adapt them for group. May schedule tours and performances and arrange for transportation and lodging. May be designated according to specialization, such as Symphonic Orchestra Leader, Jazz Orchestra Leader, Music Director.
- c. Music Administrator - (D.O.T. 152.168) - Selects and arranges program of music to meet time and content requirements for specified broadcast. Contacts recording companies and music publishers, and verifies copyright clearance for music used on broadcasts. Also see COMMUNICATIONS AND MEDIA.
- d. Choral Director - (D.O.T. 152.048) - Conducts vocal music groups, such as choirs and glee clubs. Auditions and selects members of group. Selects music to accommodate abilities of group. Directs choir at rehearsals and performances. May schedule tours and performances and arrange for transportation and lodging. May conduct group with orchestral accompaniment. Also see Religion and Theology, this pamphlet.
- e. Instrumentalist - (D.O.T. 152.048) - Plays one or more musical instruments in recital, in accompaniment, or as member of orchestra, band, or other musical group. Studies and rehearses score. May improvise or transpose music. May compose or arrange music. May be designated according to instrument played

as Bell Ringer, Drummer, Harpist, Organist, Pianist, Violinist. May play accompaniment to Singer or to other Instrumentalist and be designated Accompanist.

f. Vocalist - (D.O.T. 152.048) - Sings classical, opera, church, folk, or pop music in musical programs. Studies and rehearses words and music for performance as soloist or member of vocal ensemble. Sings art music, such as lieder, arias, or cantatas, combining musical training, expression, and quality of voice with histrionic ability. Under direction conductor. May be known according to voice range, such as soprano, contralto, tenor, or bass, or baritone. May be designated according to singing specialty such as Opera Singer, Recitalist, Vocal Soloist, Blues Singer, Folk Singer, Gospel Singer.

g. Music Therapist - (D.O.T. 079.128) - See HEALTH.

h. Music Copyist - (D.O.T. 152.588) - Copies musical scores onto stencils, plates, or manuscript paper for reproduction. Writes in musical notes indicating instrumental parts and choral arrangement. Copyist - (D.O.T. 152.288), copies musical parts onto staff paper from score written by Arranger or Orchestrator, for each instrument or voice within musical group. May transpose score to different key.

i. Prompter - (D.O.T. 152.368) - Prompts performers who forget their lines in operatic productions.

4. Music-Related Occupations

a. Music Librarian - (D.O.T. 100.388) - See PUBLIC SERVICE.

b. Piano Technician - (D.O.T. 730.281) - Repairs, refinishes, and tunes pianos, using specialized tools. As Furniture Finisher, may repair, replace, resurface, and refinish wooden parts.

c. Piano Tuner - (D.O.T. 730.381) - Tunes pianos in public and private establishments, using tuning fork and tuning hammer. May repair and refinish pianos as Piano Technician.

d. Piano-Action Regulator - (D.O.T. 730.781) - Regulates piano actions, using handtools. Aligns and adjusts a variety of action parts to operate as required individually and in relation to other parts. Depresses piano keys to verify operation of action.

e. Piano Stringer - (D.O.T. 730.884) - Threads wires through

tuning pins to string pianos, using handtools. May insert and hammer tuning pins into previously drilled holes in back panel.

f. Musical-Instrument Repairman - (D.O.T. 730.281) - Repairs percussion, stringed and wind instruments. Cleans and alters all moving parts, replaces damaged portions. May be designated Percussion-Instrument Repairman, Fretted Instrument Repairman, Wind-Instrument Repairman.

g. Music Critic - (D.O.T. 132.088) - See COMMUNICATIONS AND MEDIA.

D. ARCHITECTURE - Architecture is the art and technique of building. Like most professions, architecture is considered a service, but because of the mathematical proportions and geometric forms used, it is also considered the most abstract of the arts. The problem of architecture is how to enclose space so as to make it usable for the practical and symbolic purposes of its commissioning. In 1968, there were about 34,000 state licensed architects working in the United States, with many more unlicensed architectural school graduates employed in jobs requiring a knowledge of architecture. Approximately four percent of the architects in this country are women. About two-fifths of all architects are self-employed; most others work for an architectural firm or with engineers, builders, real estate firms, and other businesses with large construction programs. Many architects specialize in areas such as low-cost housing, landscape architecture, urban planning, and naval architecture. Some serve as consultants, advisors, or teachers.

In a large architectural firm, the architect may specialize in such work as design, drafting, specification writing, or construction contract administration.

Architects find employment throughout the country, but jobs in this field are concentrated in the large metropolitan areas, as well as those areas with rapidly expanding populations.

1. Architect - (D.O.T. 001.081) - Designs and oversees the construction of buildings and other structures. Organizes services necessary for construction. Role today is that of a master coordinator. Consults with client to determine size and space requirements, and provides information regarding cost, design, materials, equipment, and estimated building time. Plans layout of project, and integrates structural, mechanical, and ornamental elements into unified design. Prepares sketches for client. Works with contractor at building site. Writes specifications, and prepares scale and full-size drawings and other contract documents for use of contractors and craftsmen. May

specialize in particular type structure or project. May confer with other consultants to develop feasibility studies, financial analyses and arrangements, and site selection. Must be knowledgeable in areas of law, economics, accounting and taxes applicable to building.

2. Architectural Draftsman - (D.O.T. 001.281) - Plans artistic architectural and structural features of buildings and structures. Sketches designs and details, using drafting instruments. Makes engineering computations involved in the strength of material, beams, and trusses. Estimates quantities of material needed for project, and computes cost. Makes freehand drawings of proposed structure when necessary to clarify plans. May specialize in planning architectural details according to structural materials used.

3. Marine Architect - Naval Architect and Naval Designer - (D.O.T. 001.081) - See MARINE SCIENCE.

4. Landscape Architect - (D.O.T. 019.018) - See AGRI-BUSINESS AND NATURAL RESOURCES.

5. Urban Planner - (D.O.T. 199.168) - See PUBLIC SERVICE.

6. School Plant Consultant - (D.O.T. 001.168) - Formulates and enforces standards for construction and alteration of public school facilities throughout state: Prepares suggested classroom plans and layouts, taking into consideration such factors as climate, construction costs, availability of materials, and accepted principles of institutional construction. Reviews plans for construction and renovation of school buildings and approves or disapproves plans in accordance with standards and policies of department. Inspects proposed sites and schools under construction or undergoing alteration to enforce applicable standards. Confers with representatives of school boards, educators, and architects to explain and reach agreement on design concepts and construction standards. Grants variances to construction standards in special cases, on petition from local school board or builder. Provides technical information and advice to local school authorities considering construction or renovation of school plant.

E. RELIGION AND THEOLOGY - The choice of a career in a religiously-related field involves some considerations not necessarily present in other occupations. Most clergymen have chosen their careers because of their religious faith and their desire to serve the spiritual needs of others. Most of the clergy are admitted to the ministry through ordination, and these careers are almost always within an organized religious community. Theology is usually considered a special branch of philosophy. It is concerned with the analysis and interpretation of the traditional doctrines of

religion, and thus theologians are generally college and seminary teachers, and writers.

1. Clergyman - (D.O.T. 120.108) - Conducts religious worship and performs other spiritual functions associated with beliefs and practice of religious faith or denomination, and provides spiritual and moral guidance and assistance to members. Leads congregation in worship services. Prepares and delivers sermons and other talks. Interprets doctrine of religion. Instructs people who are to become members of the faith. Conducts weddings and funerals. Administers rites of baptism, confirmation, and other sacraments or ordinances. Visits sick and shut-ins, and helps poor. Counsels those in spiritual needs and comforts bereaved. Oversees religious education program. May write articles for publication and engage in inter-faith, community, civic and educational activities sponsored by or related to interest of denomination. May teach in seminaries and universities. May serve in armed forces, institutions, or industry as a Chaplain. May travel from area to area as an Evangelist, to preach at special services to awaken religion interest. May become an administrator, and policy and decision maker in denominational headquarters.

a. Protestant Clergyman - (D.O.T. 120.108) - In large churches, may have greater administrative or denominational responsibilities, and share responsibilities of the ministry with associates or assistants. May be titled Bishop, Pastor, Reverend, Vicar, Minister.

b. Roman Catholic Priest - (D.O.T. 120.108) - Hears confessions and administers the sacraments. Usually divided into two main groupings: Diocesan or Secular Priest works in a parish and is concerned with the parish churches and diocesan schools. Religious Priest belongs to a religious order such as Jesuits or Dominicans, and works as a member of a community in a specialized task such as teaching or missionary work.

c. Rabbi - (D.O.T. 120.108) - May be affiliated with one of three branches of American Judaism: Orthodox, Conservative, or Reform.

d. Missionary - (D.O.T. 120.108) - Carries religious message to lands and peoples not of own faith to win converts and establish native church, where there is no self-supporting local organization. May also provide educational, medical, nursing, and social service.

2. Director of Religious Activities - (D.O.T. 129.108) - Directs and coordinates activities of various denominational groups to meet religious

needs of students. Meets with religious advisors and councils to coordinate overall religious program. Assists and advises groups in promoting inter-faith understanding. Interprets policies of university to community religious workers and confers with administrative officials concerning suggestions and requests for religious activities. Provides counseling and guidance relative to marital, health, financial, and religious problems. Plans and conducts conferences and courses to assist in interpretation of religion to various academic groups and in understanding their own faiths, and convictions of other groups.

3. Director of Religious Education - (D.O.T. 129.108) - Plans, organizes, and directs church or synagogue school. Develops study courses and supervises instructional staff. Counsels students. Promotes student participation in extracurricular church activities. Visits homes of church members and confers with clergymen, denominational officials and organizations to solicit support and participation and to stimulate interest in educational programs. Participates in such denominational activities as giving help to new congregations and small churches, fellowships, and synagogues. Interprets work of school to public through speaking or discussion-leading, and contributes articles to local and national publications. Responsible for school supplies.

4. Minister of Sacred Music - (D.O.T. 152.048) - Selects and arranges program of music to meet time and content requirements of religious services. Consults with clergyman to determine type of music needed, and integrates it within program. In small organization, may serve as Choir Director, in recruiting, training, and directing choir or choral singing. Works with Organist and Instrumentalists, in coordinating and performing musical program. Responsible for ordering musical supplies. Establishes musical groups to represent organization at civic and community events. Also see Choral Director, this pamphlet.

5. Christian Science Practitioner - (D.O.T. 129.108) - Promotes healing of sick and reforms religious transgressors, employing prayer in accordance with Christian Science teachings. Encourages patients to apply Christian Science principles of healing.

6. Parish Worker - (D.O.T. 129.208) - Performs lay duties to assist religious leaders: Visits members of congregation, especially sick, and provides welfare services. Preaches at and conducts religious meetings. Prepares candidates for acceptance by religious body. May specialize as Youth Leader or Welfare Worker. May teach religion to children. May assist with clerical work.

F. LANGUAGE AND LINGUISTICS - Linguistics is the science as well as the art of language. It is concerned with origins, structures, modifications, etc., and includes the fields of phonetics, phonemics, morphology, syntax, and semantics. Linguistics is ordinarily divided into four branches; historical linguistics deals with the evolution of languages; descriptive linguistics involves studies of one or more languages at a given stage of development; comparative linguistics compares and contrasts related languages; while geographical linguistics classifies languages and dialects on a regional basis.

1. Linguist - (D.O.T. 059.088) - A person who is skilled in foreign languages, particularly living languages. Employment opportunities would be found in such fields as foreign trade, consular work, government service, social work, science, cultural centers, library science, research, teaching, travel agencies and international transportation organizations.

a. Interpreter - (D.O.T. 137.268) - Translates spoken passages of a foreign language into a specified language. May be designated according to languages interpreted.

b. Translator - (D.O.T. 137.288) - Translates documents from one language to another language. When working as a Foreign Correspondent, reads, translates, and answers mail written in a foreign language. May serve as a Foreign News Translator or Voice Interceptor in translating radio messages, news and script into English. Translates similar material from English into a foreign language for broadcast to a foreign country. May also translate technical foreign-language radio-communications service telegrams (pertaining to company operations) received from station in foreign countries, as well as translating English messages into a foreign language for transmission. Sometimes translates scientific or technical documents into foreign languages, usually specializing in a particular science, such as engineering, physics, or medicine. Foreign-Exchange Code Clerk codes and decodes cables relating to foreign exchange transactions and translates into English decoded foreign-language messages to facilitate foreign commerce through domestic banks. May code and transmit outgoing messages by teletype.

2. Scientific Linguist - (D.O.T. 059.088) - Studies components, structures, and relationships within a language to provide better understanding of its social functioning. Prepares description of sounds, forms, and vocabulary of a language. Contributes to the development of linguistic theory. Applies theory to at least one of the following: development of improved methods in translation, either computerized or not; the teaching of a language to other than native

speakers; preparation of language-teaching materials, dictionaries, and handbooks; reducing previously unwritten languages to standardized written form; preparation of tests for language-learning aptitudes and language proficiency; consultation with governmental agencies in their language programs; preparation of descriptions of two languages in comparison with each other for the purpose of improving teaching or translating between them.

a. Etymologist - (D.O.T. 059.088) - Performs research relative to origin, history, and development of words. Traces derivation of words by analysis of component parts, pointing out probable roots and tracing their meaning from their origin in the parent language to present usage.

b. Philologist - (D.O.T. 059.088) - Studies structure and development of language. Traces origin and evolution of words and syntax through comparative analysis of ancient parent languages and modern language groups, studying word and structural characteristics such as morphology, semantics, phonology, accent, and grammar. Identifies and classifies obscure languages, according to family and origin. Reconstructs and deciphers ancient languages.

c. Phonologist - (D.O.T. 059.088) - Skilled in the science of speech sounds as elements of a language. Includes study of speech organs and ear. Also see HEALTH.

G. HISTORY AND MUSEUMS - History is that branch of knowledge which deals systematically with the past; it studies the nature and pattern of human experience since the appearance of the first civilizations. It explores societies as their behavior, during the ordeals they undergo, progressively differentiates them. History traces societies as well as their individual members in space and time, throwing light on the nature of the community and concerning itself with philosophical explanations of causes. It records, analyzes, and coordinates the available data, interpreting past events in terms of individuals, or social cultural, ethnic, political, or geographic groupings, and it uses this knowledge to analyze current events and to predict future effects.

1. Historian - (D.O.T. 052.088) - Prepares in narrative, brief, or outline form chronological account or record of past or current events dealing with some phase of human activity, particularly those events affecting nations, institutions, science, or art. May specialize in history of a specific country or region, or in a particular period of time, or in other phases of history in such fields as economics, the

military, sociology, philosophy, art, and architecture. May trace historical development of current fields, such as transportation or technological changes. Most are college teachers who also do research, lecturing, and writing. May act as adviser or consultant, and perform research for individuals, institutions, and commercial organizations. Some edit historical materials, prepare exhibits, write pamphlets and handbooks, lecture for museums, libraries, and historical societies. Some work for large corporations, or for museums or libraries. Also see PUBLIC SERVICE.

a. Biographer - (D.O.T. 052.088) - Specializes in reconstruction in narrative form of career or phase in life of an individual. Assembles biographical material from sources such as news accounts, diaries, personal papers and correspondence, written accounts of events in which the subject participated, and consultations with associates and relatives. Portrays character and may interpret behavior of subject on basis of his historical environment and the application of psychological analysis, relating his activities to pertinent events during his lifetime.

b. Genealogist - (D.O.T. 052.088) - Conducts research into genealogical background of an individual or family in order to establish descent from a specific ancestor or to discover and identify forebears. Constructs charts of family relationships and prepares history of family in narrative form or brief sketches.

c. Dramatic Arts Historian - (D.O.T. 052.088) - Conducts research to authenticate details, such as customs, costumes, manners of speech, architectural styles, modes of transportation, and other items peculiar to given period or specific locality, to avoid inaccuracies in presentation of stage or radio dramas or motion pictures. Also see COMMUNICATIONS AND MEDIA.

d. Research Director - (D.O.T. 052.168) - Works as technical advisor in motion pictures. See Dramatic Arts Historian above. Also see COMMUNICATIONS AND MEDIA.

e. Consultant - (D.O.T. 052.088) - Serves as adviser and researcher to editors, publishers, and in the fields of COMMUNICATIONS AND MEDIA and governmental research.

f. State Historical Society Director - (D.O.T. 052.038) - Directs activities of society, conducts research, writes, and acquaints public with aims of society.

2. Archivist - (D.O.T. 101.168) - Specializes in identifying, preserving, and making available documentary materials of historical

value, and participates in research activities based on archival materials. Appraises documents, such as government records, minutes of corporate board meetings, letters from famous persons, and charters of non-profit foundations. Prepares or directs preparation of reference aids for use of archives, such as accession lists, indexes, guides, bibliographies, abstracts, and microfilmed copies of documents. Advises government agencies, scholars, journalists, and others conducting research by supplying available materials and information, according to familiarity with archives and with political, economic, military, and social history of period. Requests or recommends pertinent materials available in libraries, private hands, or other archives. Selects and edits documents for publication and display, literary or journalistic expression, and techniques for presentation and display. May be designated according to subject matter specialty such as Economic History, Military History, Political History, or according to nature of employing institution. In smaller organizations, may direct activities of libraries. Also see PUBLIC SERVICE.

3. Anthropologist - (D.O.T. 055.088) - See PUBLIC SERVICE.

4. Museum Related Occupations -

a. Curator - (D.O.T. 102.118) - Administers affairs of museum and conducts scientific research programs. Directs activities concerned with instructional, research, and public service objectives of institution. Interprets and assists in formulating policies. Supervises curatorial, preparatory and clerical staff. Administers exchange of loan collections. Obtains, develops, and organizes new collections. Organizes and conducts field parties engaged in scientific research, and performing duties, such as gathering scientific papers, selecting personnel, and securing financial support. Conducts research on new acquisitions. Investigates new methods and techniques used to prepare and present specimens, models, diagrams, and other visual aids for exhibit. Such collections would include: art galleries, herbariums, horticultural museums, medical museums, oceanariums, natural history museums, planetariums, zoological gardens, historical museums, wax museums, and industrial museums. Also see PUBLIC SERVICE.

b. Museum Technician - (D.O.T. 102.381) - Prepares specimens for museum collections and exhibits. Maintains museum files. Cleans, catalogs, labels, and stores specimens. May install, arrange, and exhibit materials. Technician entitled Restorer of Lace and Textiles prepares ancient fabrics for display in textile

museum. Cleans, repairs and reweaves worn and decayed fabrics. Mounts fabric on suitable frame. Also see PUBLIC SERVICE.

c. Historic Sites Supervisor - (D.O.T. 109.118) - Directs and coordinates activities of personnel engaged in investigating, acquiring, marking, improving, and preserving historic sites and natural reserves in conformity with state policy. Authorizes acquisition and improvement of sites within budget. Provides information and encouragement to individuals and groups attempting to acquire and maintain landmarks not considered feasible for state acquisition. Directs workers engaged in preparation of information brochures, exhibits, maps, and photographs. Serves as custodian of historic documents acquired during research efforts.

d. Armorer Technician - (D.O.T. 109.281) - Specializes in restoring and preparing exhibits of medieval arms and armor, designs and directs workers engaged in fabricating missing or broken parts. Conducts research to determine authenticity and classifies and catalogs articles.

e. Research Assistant and Encyclopedic Research Worker - (D.O.T. 109.288) - Conducts research on historical monuments, buildings, and scenes, in order to reconstruct them to scale in dioramas for use by Fine Arts students and for other university purposes. Collects information from libraries, museums and art institutes.

f. Art Appraiser - (D.O.T. 149.287) - Examines works of art such as paintings, sculpture, and prints to determine their authenticity and value. Examines work for color values, style of brush-strokes, esthetic correctness, and other characteristics, to establish art period or identify artist. May illuminate work with quartz light to determine whether discoloration is present. May X-ray painting and apply chemical tests to detect forgery or to authenticate work.

**FINE ARTS
AND
HUMANITIES**

THE VISUAL ARTS

The grouping of those occupations concerned with the design of products and the art images used in advertising and the fine arts.

OCCUPATIONS IN WRITING

The grouping of those occupations concerned with communication through written forms.

THE PERFORMING ARTS

The grouping of those occupations concerned with music, theatre, and the dance.

ARCHITECTURE

The grouping of those occupations concerned with the planning and designing of buildings, and the supervision for building construction.

RELIGION AND THEOLOGY

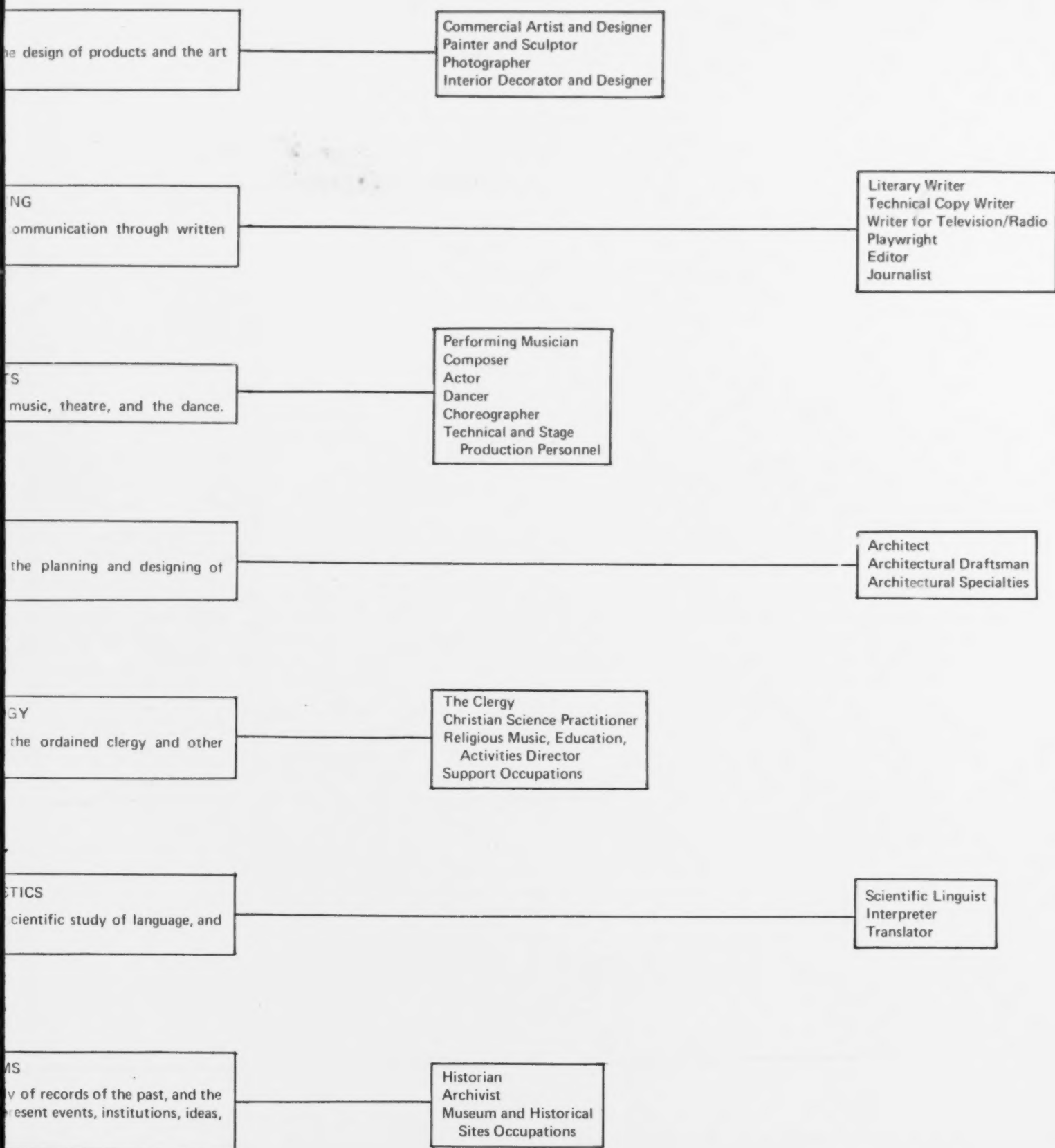
The grouping of those occupations concerned with the ordained clergy and other religiously oriented fields.

LANGUAGES AND LINGUISTICS

The grouping of those occupations concerned with the scientific study of language, and with those requiring multi-lingual skills.

HISTORY AND MUSEUMS

The grouping of those occupations concerned with study of records of the past, and the use of these materials to describe and analyze past and present events, institutions, ideas, and people.



HEALTH



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HEALTH

I. INTRODUCTION

Due to rising population and greater individual emphasis on obtaining health protection and health care, there is a tremendous need for more health workers to provide optimum services and facilities to maintain a high level of health for our citizens. The two fields of medicine and careers allied to it are inseparable. They are common partners working together to make life healthier, happier, and more productive for each of us.

We have witnessed a mounting interest among students of all age groups in investigating career opportunities in the field of health, and the increasingly complex and changing nature of occupations in our modern society makes it imperative that young persons on the threshold of planning for a career be fully cognizant, not only of the many career opportunities open to them, but of the working conditions, opportunities and prospects in these occupations. The development of a growing volume of up-to-date and accurate information about occupations is particularly needful for those occupational areas which are expanding and which are encountering a continuing shortage of trained workers.

This Health Careers Guide is offered to young people, their parents, and counselors in the hope that it will be a useful and informative tool in helping choose career goals.

II. METHODOLOGY

The information included within the cluster was gathered and assembled by a detailed review of the literature concerning it and by conferring with practitioners and academic specialists in the fields.

The Dictionary of Occupational Titles proved to be a most valuable aid but was somewhat incomplete in a number of areas. It was supplemented by the Occupational Outlook Quarterly, Health Careers, and Vocational Education and Occupations published by the Department of Labor, Occupational Outlook Handbook published by the Department of Health, Education and Welfare, Horizons Unlimited published by the American Medical Association, and Federal Careers published

by the Civil Service Commission. The Director of Health Occupations at Grayson County College was consulted along with registered nurses in the field. One General Practitioner, an Internal Medicine Specialist, an Osteopath, and Pedodontist complete the examples of persons and professions consulted.

Public libraries in Sherman and Denison and institutional libraries at Grayson County College and Austin College were most helpful.

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual Job Families, with a listing and discussion of the function of individual occupations, are listed below:

A. MENTAL HEALTH AND MENTAL HEALTH SERVICES - The professions and occupations within this family concern the study and treatment of individuals with such serious mental and emotional disturbances that they may develop physical symptoms, or lose the capacity to lead rational lives. They are equally concerned in helping people overcome emotional disturbances before they become serious and, even better, in helping to forestall such difficulties. The following are examples of professions and occupations found within this family.

1. Psychiatrist - (D. O. T. 370.108) - Is the head of the mental health team. Studies, diagnoses, and treats diseases and disorders of the mind, determines the nature and extent of the mental disorder and formulates the treatment program. Treats or directs treatment of the patient, utilizing somatic, group, and milieu therapy, and a variety of psychotherapeutic methods and medication.
2. Psychiatric Aid - (D. O. T. 355.878) - Assists mentally ill patients, working under direction of nursing and medical staff. Assists the patients in bathing, dressing, and grooming. Assists patients in becoming accustomed to hospital routine and encourages them to participate in social and recreational activities. Observes patients to detect unusual behavior, and aids or restrains them to prevent injury to themselves or other patients.
3. Psychiatric Nurse - (D. O. T. 375.378) - Works with the psychiatrist or in mental institutions or for public health organizations in caring for the mentally ill. She is a member of the mental health team.
4. Psychiatric Social Worker - (D. O. T. 195.108) - Helps people who are mentally or emotionally disturbed. Is a member of the

mental health team. Frequently, the first staff member to see the patient and obtains from him a complete family history. This information, together with the findings made by a psychologist, is of the greatest importance to the psychiatrist, both in understanding the patient's particular illness, and in planning his treatment.

5. Psychometrist - (D.O.T. 045.268) - Is less highly trained than the psychologist and often works under his supervision. The psychometrist specializes in administering tests. Is important in measuring people's mental, emotional, and social characteristics.

6. Psychologist - (D.O.T. 045.108) - Is an important member of the mental health team and is to some extent a research scientist. The science of psychology is one of the main sources of our increasing understanding of mental capacity and intelligence, and of how the emotions affect health. The psychologist continuously contributes to improvements in methods of diagnosing and treating mental health problems or, still better, preventing them. One of the most familiar products of psychological research in the I.O. test.

7. Social Psychologist - (D.O.T. 045.088) - Differs from the clinical or counseling psychologist because he is mainly concerned with group reactions and behavior. He studies, for example, the ways in which our social attitudes develop and how the individuals who make up families and neighborhoods and communities react upon each other.

B. MEDICAL AND BIOLOGICAL SCIENCE SERVICES - The occupations included within this family support and amplify the whole medical profession. These occupations are service occupations and are basically fact-finding in nature, these facts themselves being interpreted by physicians and pathologists directing the work. They are concerned with direct biological patient care.

1. Cytotechnologist - (D.O.T. 078.281) - Is a comparatively new member of the health profession. Is trained in special laboratory techniques for detecting body cell changes which are particularly important in the early diagnosis of cancer. Working under a pathologist, the cytotechnologist screens slides of cell samplings magnified a thousand times.

2. Histologic Technician - (D.O.T. 078.381) - Cuts and stains tissues which have been removed from the body so that they can be examined microscopically by the pathologist for any signs of malignant or questionable cells.

3. Blood Bank Technologist - (D. O. T. 078.381) - Handles all the jobs pertaining to blood transfusions, one of the biggest advances in modern medicine. The blood bank technologist collects blood from donors, classifies it, and stores it so that it can be instantly available, either as whole blood or as plasma.

4. Medical Technologist - (D. O. T. 078.281) - Works directly under the supervision of a physician and helps him by carrying out a variety of laboratory procedures. It is impossible to list all of these but the technologist must be able, for example, to count blood cells, do blood groupings, make chemical tests of body fluids, prepare tissue specimens, and identify microorganisms found in air, milk, water, and certain body materials. Technologists are trained to operate some kinds of special apparatus and an array of precision instruments: electronic counters, automatic analyzers, centrifuges, microscopes, autoclaves, spectrophotometers, colorimeters and microtomes.

5. Biochemistry Technologist - (D. O. T. 078.281) - Performs qualitative and quantitative chemical analyses of body fluids and exudates to provide information used in diagnosing and treating diseases. Tests body specimens such as urine, blood, spinal fluid, and gastric juices for presence and quantity of metabolic substances and byproducts such as sugar, albumen, and acetone bodies and for various chemicals, drugs, and poisons.

6. Microbiology Technologist - (D. O. T. 078.281) - Cultivates, isolates, and assists in identifying bacteria and other microorganisms and performs various bacteriological, mycological, virological, and parasitological tests. Receives human or animal body materials from autopsy or diagnostic cases or collects specimen directly from patients under supervision of the pathologist. He examines materials for evidence of disease or parasites.

7. Electrocardiograph Technician - (D. O. T. 078.368) - Records electromotive variations in action of heart muscle using electrocardiograph machine to provide data for diagnosis of heart ailments. Sends results to cardiologist for analysis and interpretation.

8. Electroencephalograph Technician - (D. O. T. 078.368) - Measures impulse frequencies and differences in electrical potential between various portions of the brain using equipment that records data as a series of irregular lines on a continuous graph to be used by medical practitioners in diagnosing brain disorders.

9. Radiologic Technologist - (D. C. T. 078.368) - Helps physicians by doing the mechanical and routine work connected with x-ray use. Arranges the patient in the prescribed position, takes the x-ray picture, and keeps necessary records for each patient.

10. X-Ray Technologist - (D. O. T. 078.368) - See Radiologic Technologist.

11. Medical Laboratory Assistant - (D. O. T. 078.381) - Performs routine tests in the medical laboratory for use in treatment and diagnosis of disease. Prepares tissue samples for the pathologist, takes blood samples, and prepares vaccines. He executes such laboratory tests as urinalyses and blood counts using microscopes, micrometers, and similar instruments. Makes quantitative and qualitative chemical and biological analyses of body specimens under the supervision of the medical technologist or pathologist. May be designated according to the field of specialization as a Blood-Bank Technician, Cytotechnician, Hematology Technician, Serology Technician or Tissue Technician.

12. Laboratory Assistant, Plasma Drawing-Off - (D. O. T. 078.637) - Selects and prepares pools of sterile bleedings preparatory to drawing off blood plasma. Inspects whole blood units, separated by centrifuging or sedimentation, for discoloration or presence of fatty substances and rejects unsatisfactory units.

13. Physician's Assistant - He is a new comer to American medicine, and although recognition of his potential contribution is growing, exactly what he should do and how he should be trained are questions still unanswered. The physician's assistant is a highly skilled worker who, under the supervision of a licensed physician, performs many of the routine duties usually carried out only by doctors. Gives routine physical examinations, treats cuts and burns, performs laboratory tests on blood and other body contents, and applies casts to simple fractures. He makes rounds at the hospital, examines patients, takes histories on new admissions, prepares discharge summaries, and helps perform other medical duties.

14. Medical Assistant - (D. O. T. 079.368) - Prepares treatment rooms for examination of patient, drapes patients with covering, and position instruments and equipment. Hands instruments and materials to physician as directed and sterilizes and cleans instruments. Interviews patients and checks pulse, temperature, blood pressure, weight and height. May operate equipment, give injections or treatments and assist in the laboratory. All these functions are performed under the direction of a physician.

15. Surgical Technician - (D. O. T. 079.378) - Performs any combination of the following tasks before and during an operation: washes, shaves, and sterilizes the operative area of the patient. Scrubs hands, dons caps, masks, gowns, and rubber gloves. Places equipment and supplies in the operating room according to the Surgeon's directions and arranges instruments as specified by the General Duty Nurse. Maintains specified supplies of such fluids as plasma, saline, blood, and glucose for use during the operation. Washes and sterilizes used equipment using germicides, autoclave, and sterilizers. May assist in administering blood, plasma, or other injections and transfusions and may hand the surgeon needed instruments during the operation.
16. Obstetrical Technician - (D. O. T. 079.378) - See Nurse, Licensed, Practical, this pamphlet.
17. Nuclear Medical Technologist - (D. O. T. 078.381) - Prepares, administers, and measures radioactive isotopes in therapeutic, diagnostic, and tracer studies utilizing a variety of radioisotope equipment. Prepares stock solutions of radioactive materials and calculates doses to be administered by the radiologist. Measures glandular activity, traces radioactive doses, and calculates the amount of radiation using equipment such as Geiger Counters, electrosopes, scalers, scintillation and position scanners, and scintigrams. Calibrates equipment, subjects patients to radiation and x-ray therapy as prescribed by the radiologist using such equipment as radium emanation tubes and needles, x-ray machines, and similar instruments. Executes blood volume, red cell survival, and fat absorption studies following standard laboratory techniques.
18. Radiological Health Specialist and Technicians - (D. O. T. 199.187) - Are concerned with the careful control of radiation. The radiological health specialist and other radiological health specialist and other radiological health personnel seek to maintain a balance between exposure hazards and the benefits of radiation uses and to assure that adequate protective measures are used. They analyze air, water, and food for radioactivity in order to assess the hazard to people. Are employed by government, hospitals, and private industry.
19. Veterinary Laboratory Technician - (D. O. T. 073.381) - prepares vaccines, biologicals, and serums for prevention of animal diseases. Innoculates different media with organism, incubates the bacteria for specified periods of time and prepares vaccines and serums by standard laboratory methods. Examines meat and dairy products to determine if products meet standards of

quality and purity. Prepares standard volumetric solutions and reagents used in testing and cleans laboratory equipment.

C. DENISTRY AND DENTAL SCIENCE SERVICES- Dentists and Dental Science Services are concerned with treating ailments or abnormalities of the gums and teeth and trying to prevent their occurrence. Supporting the dentist and working closely with him are a number of allied occupations which are also discussed below.

1. Dentists - (D. O. T. 072.108) - In general, examine teeth and other tissues of the mouth to diagnose diseases or abnormalities. They take x-rays where necessary, fill cavities in the teeth, straighten teeth, and treat gum diseases. They extract teeth and substitute artificial dentures especially designed for the individual patient. Dentistry also includes many specialized fields with the following D. O. T. number (D. O. T. 072.101): Orthodontists, who straighten teeth; Oral Surgeons, who operate in the mouth and jaws; then, there are the fields of pedodontics, dentistry for the children; prosthodontics, making artificial teeth or dentures; endodontics, root canal therapy; periodontology, treating the tissues that support the teeth; public health dentistry, concerning dental public health; and oral pathology, which concerns diseases of the mouth.
2. Dental Hygienist - (D. O. T. 078.361) - Removes deposits and stains from the teeth and applies prescribed medication, takes and records medical and dental histories, prepares diagnostic tests for interpretation by the dentist, takes and develops dental x-rays, sterilizes instruments, and teaches people the techniques of mouth care and proper diet.
3. Dental Assistant - (D. O. T. 079.378) - Works directly with the dentist by preparing the patient for treatment, obtaining his dental records, keeping the patient's mouth clean by using suction devices, and handing the dentist the proper instruments and materials. The work of the dental assistant should not be confused with that of the dental hygienist. Dental assistants, for instance, do not perform work in the patient's mouth such as oral prophylaxis.
4. Dental Laboratory Technician - (D. O. T. 712.381) - Makes artificial teeth, crowns and other dental and orthodontic appliances once made by dentists. Makes metal castings for dentures, finishes and polishes dentures, constructs metal or porcelain crowns, and makes appliances to correct abnormalities such as cleft palates.
5. Dental Ceramist - (D. O. T. 712.281) - Makes and repairs porcelain teeth according to dentists' prescriptions, mixes porcelain to a color of natural teeth according to prescription.

6. Dental Ceramist Assistant - (D. O. T. 712.281) - Is a porcelain finisher and a porcelain waxer. Additional occupations in dentistry may be available depending on the amount of work and the degree of job specialization in a particular location.

D. GENERAL HOSPITAL AND MEDICAL OFFICE RELATED

OCCUPATIONS The occupations within the family aid the health services in very general ways such as record keeping and supplies, etc. The personnel may or may not be certified or licensed.

1. Central Supply Supervisor - (D. O. T. 079.168) - Directs activities of hospital central supply room to furnish sterile and nonsterile supplies and equipment for use in care and treatment of patients. Supervises cleaning, assembling, and packing of linens, gowns, dressings, gloves, treatment trays, instruments, preparation of solution, arrangement of stock, requisitioning, issuing, controlling, and charging of supplies and equipment. Insures that aseptic techniques are employed by personnel in preparing and handling sterile items.
2. X-Ray Clerk - (D. O. T. 079.368) - Takes chest x-ray pictures of incoming hospital patients to detect the presence of tuberculosis. Prepares the appropriate forms for the business office. Sends the exposed film to the x-ray department for processing and performs other clerical tasks as the need arises.
3. Diet Clerk - (D. O. T. 079.588) - Compiles dietary information for use by kitchen personnel in preparation of foods for hospital patients. Examines diet orders received from the wards and tallies portions and foods of each type diet, such as general diet, gastric diet, and light diet. Marks the amounts of tally on the master menu to inform kitchen personnel of food requirements. Processes new diets and changes as required and keeps records of patients' rooms to insure delivery of food at meal time.
4. Nursing Aid - (D. C. T. 355.878) - Assists in the care of hospital patients under the direction of the nursing aid medical staff. Answers signal lights and bells to determine patients' needs, and serves and collects food trays and feeds patients requiring help. Dusts and cleans, runs errands, directs visitors, and answers the telephone.
5. Central Supply Aid - (D. O. T. 223.887) - Cleans, sterilizes, and assembles hospital equipment, supplies, and instruments according to prescribed procedures and techniques performing any combination of the following tasks: scrubs and washes surgical instruments, containers, rubber gloves, and syringes and equipment,

such as aspirators, croupettes, and oxygen supplies. Sterilizes instruments, equipment, surgical linens, and supplies, such as surgical packs, treatment trays, rubber gloves and syringes using autoclaves, water sterilizers or antiseptic solutions.

6. Receptionist - (D.O.T. 237.368) - Interviews incoming patients or representatives, records information required for admission, and assigns patients to rooms. Interviews the patient or representative to obtain and record name, address, age, religion, persons to notify in case of emergency, attending physician, and individual or insurance company responsible for payment of bill. Explains hospital regulations such as visiting hours, payment of accounts, and schedules of charges. Assigns the patient to the room or ward and escorts the patient or arranges for escort to the assigned room.

E. MEDICAL EMERGENCY SERVICES - Standard No. 11 of the National Highway Safety Act of 1966 recommended the preparation of skilled personnel who would operate emergency medical vehicles and equipment.

Medical emergency personnel provide skills in diagnoses and emergency treatments short of those rendered by a physician or paramedical personnel under direct supervision of a physician. They have skills developed in the use and care for all equipment required to accomplish their job. The following occupations are basically the make up of the medical emergency services group.

1. Ambulance Driver - (D.O.T. 913.883) - Drives the ambulance to transport sick, injured, or convalescent persons. Places the patient on the stretcher and loads the stretcher into the ambulance, usually with the help of the ambulance attendant. Changes soiled linen on the stretchers and administers first aid as needed. Uses skill and knowledge in driving to avoid sudden motions detrimental to patients.

2. Ambulance Attendant - (D.O.T. 355.878) - Accompanies and assists ambulance driver on calls. Assists in lifting the patient onto wheeled cart or stretcher and into and out of the ambulance. Renders first aid, such as bandaging, splinting, and administering oxygen. May perform the same work in an air ambulance.

3. First-Aid Attendant - (D.C.T. 354.878) - Renders first aid and subsequent treatment to injured or ill patients whether in an ambulance, at an industrial plant, commercial establishment, mine, or construction site. Sterilizes, disinfects, anoints, and bandages minor cuts and burns. He applies artificial respiration or administers oxygen in case of suffocation, and asphyxiation. Administers

medication, such as aspirin or antiseptic solutions, to relieve pain or prevent infections until the patient can receive professional care and gives prescribed medicines and treatments for illness.

F. ADMINISTRATION OF HEALTH SERVICES - The occupations included within this family are concerned with managing and directing all aspects of health services in hospitals, health departments, and voluntary agencies. Those occupations which deal with "business" skills and those who take care of plant maintenance and other services are also important.

1. Hospital Administrator - (D. O. T. 187.118) - Sees that all the hospital's objectives are carried out--providing services for the sick and injured, furthering scientific knowledge, providing professional training, and promoting community health. Is directly responsible to the hospital's governing body who set the broad policies under which the hospital operates. Is also the hospital's representative to the community. The administrator is responsible for developing an effective team of the physicians, nurses, dietitians, pharmacists, housekeepers, engineers, and others who work in the hospital, and for seeing that adequate supporting facilities, services, and equipment are available. Holds a community trust; it is his obligation to see that the hospital provides care of the highest possible quality at the lowest possible cost to the consumer. May also be an administrator in a nursing home.
2. Administrative Assistant - (D. C. T. 169.168) - Aids the executive in staff capacity by coordinating office services such as personnel, budget preparation and control, housekeeping, records control, and special management studies. Work of this type is highly detailed, and for young people coming into this field it offers an opportunity to learn practically all there is to know about a particular phase of hospital operation.
3. Medical Officer - (D. O. T. 070.108) - Plans and participates in medical care or research programs in hospitals, clinics, or other public medical facilities. Provides medical care for eligible persons and institutes programs of preventive health care in counties, cities, or other government or civic divisions. Gives vaccinations, imposes quarantines, and establishes sanitary and other health standards for hospitals, restaurants, and other public places. May have the responsibility for health services of a county and be designated as Health Officer, County.
4. Accountant - (D. O. T. 160.188) - See BUSINESS AND OFFICE OCCUPATIONS.

5. Controller - (D. O. T. 186.118) - See BUSINESS AND OFFICE OCCUPATIONS.

6. Credit Manager - (D. C. T. 168.168) - See BUSINESS AND OFFICE OCCUPATIONS.

7. Personnel Director - (D. O. T. 166.118) - See BUSINESS AND OFFICE OCCUPATIONS.

8. Public Relations Director - (D. O. T. 165.068) - See BUSINESS AND OFFICE OCCUPATIONS.

9. Purchasing Agent - (D. O. T. 162.158) - See MARKETING AND DISTRIBUTION.

10. Admitting Officer - (D. O. T. 237.368) - Arranges for admission of patients to the hospital. Interviews patients or relatives to obtain necessary personal and financial data and to determine their eligibility for admission. Assigns accommodations based on the physician's admittance orders, patient's preference, nature of the illness and availability of space. Prepares records of admission, transfer, and other data that may be required.

11. Director of Volunteer Services - (D. O. T. 187.168) - Directs and coordinates work of volunteer agencies and workers offering their services to the hospitals and secures the services of volunteer workers. Organizes classes of instruction for volunteers to teach proper procedures and techniques. Suggests and directs projects to be carried out by volunteer workers in the hospital.

12. Executive Housekeeper - (D. O. T. 187.168) - Directs institutional housekeeping program to insure clean, orderly and attractive conditions of the establishment. Establishes standards and procedures for work of the housekeeping staff and plans work schedules to insure adequate service. Inspects and evaluates the physical condition of the establishment and submits to the management recommendations for painting, repairs, furnishings, relocation of equipment, and reallocation of space. Organizes and directs departmental training programs, resolves personnel problems, and hires new employees.

G. PERSONAL AND COMMUNITY HEALTH SERVICES - The professions and occupations within this family are concerned with care of the sick and with the prevention of illness in homes, schools, clinics and industries. They have a special opportunity and obligation to help people develop the knowledge, attitude, and the skills they need to live healthfully and safely.

1. Community Services and Health Education Officer - (D. O. T. 079.168) - Plans and directs statewide programs of public health education and promotes the establishment of local health services. Directs workers engaged in preparation and distribution of health information materials, such as brochures, films, weight charts, and first aid kits. Promotes the establishment or expansion of local health services and provides technical assistance to individuals and groups conducting health conferences, workshops, and training courses. Coordinates special health education campaigns during epidemics, rabies outbreaks, instances of food poisoning, and similar emergencies.
2. Public Health Educator - (D. C. T. 079.118) - Plans, organizes, and directs health education programs for group and community needs. Conducts community surveys and collaborates with other health specialists and civic groups to ascertain health needs, develops desirable health goals, and determines availability of professional health services. Develops and maintains cooperation between public, civic, professional, and voluntary agencies, and prepares and disseminates educational and informational materials. Promotes health discussions in schools, industry, and community agencies.
3. Public Health Nurse - (D. O. T. 075.128) - Renders nursing services concerned with public health, working in government or voluntary public health agencies, and instructs lay persons in health education and disease prevention. Visits homes to render nursing services and instructs families in care of patients and maintenance of healthful environments. Assists persons with social and emotional problems to secure aid through community resources, and teaches home nursing, maternal and child care, and other subjects related to individual and community welfare.
4. School Nurse - (D. O. T. 075.128) - Plans and carries out, in cooperation with medical authorities and administrative school personnel, policies, standards, and objectives of school health programs. Participates in medical examinations and reviews findings to evaluate health status of pupils and the progress of the programs. Instructs classes in subjects such as child care, first aid, and home nursing and establishes nursing policies to meet emergencies. Cooperates with school personnel in identifying and meeting social, emotional, and physical needs of school children. Administers immunizations and maintains health records of students.
5. Sanitarian - (D. O. T. 079.118) - Is concerned with the interpretation and enforcement of city, state, Federal or other laws regarding sanitary standards. Also has responsibilities in the

area of food, milk, and water protection. The case, use, and interpretation of measuring devices and control procedures in the areas of air pollution and control of radiological health hazards are examples of recent problems of interest to the public health sanitarian. The sanitarian plays an important role in obtaining community action, for better health through environmental health control.

6. Sanitarian's Aid - (D.O.T. 168.287) - Investigates public and private establishments such as restaurants, hotels, homes, cafeterias, and places of public gatherings to determine compliance with or violation of public sanitation laws and regulations. Inspects eating and drinking establishments for cleanliness and determines if vermin or other pests such as rats and mice are present. Take samples of such materials as water, food, and air and performs or orders chemical, physical, or biological tests to determine contaminants.

7. Home Health Aid - (D.O.T. 354.878) - Cares for elderly, convalescent, or handicapped persons in patients' homes and performs any combination of the following tasks: changes bed linens, washes and irons patients' laundry, and cleans patients' quarters. Purchases, prepares, and serves food for the patient and other members of the family, following special prescribed diets. Assists patients into and out of beds, automobiles or wheelchairs to lavatories and up and down stairs. Assists the patient to dress, bathe, and groom himself. Accompanies ambulatory patients outside the home, serving as guide, companion and aid.

H. PHARMACEUTICAL SCIENCE AND SERVICES - The pharmacy is a community center for information on topics related to health, and the pharmacist, who is more than a dispenser of drugs and health supplies, cooperates actively with physicians and with public and private health agencies in promoting well being among people in his neighborhood.

1. Pharmacist - (D.O.T. 074.181) - Is a specialist in the science of drugs. Understands their composition, chemical properties, manufacture and uses, and is able to test them for purity and strength. He is able to compound medicines so that he can dispense prescription orders written by physicians, dentists, and veterinarians. Is frequently consulted by physicians about various drugs and their availability, etc.

2. Pharmacy Helper - (D.O.T. 074.387) - Mixes pharmaceutical preparations under direction of the pharmacist. Issues medicines,

labels and stores supplies, and cleans equipment. Labels drugs, chemicals, and pharmaceutical preparations. Mixes preparations such as mouthwash and dilutes other preparations by adding water and stirring, performing these tasks under direction of the pharmacist. Prepares inventory and orders supplies to maintain level of stock.

I. PROFESSIONAL MEDICAL SUPPORTIVE PERSONNEL - The occupations included within this family are not necessarily involved with the direct medical treatment of the patient but are most essential in the total picture of medical services. Their particular facet is an integral part of patient care.

1. Research Nutritionist - (D. O. T. 077.081) - See CONSUMER AND HOME MAKING EDUCATION.

2. Dietitian - (D. O. T. 077.168) - See CONSUMER AND HOME MAKING EDUCATION.

3. Prosthetist-Orthotist - (D. O. T. 078.368) - Writes specifications for and fits artificial limbs, braces, and appliances for body deformities and disorders following prescriptions of the physician or other qualified medical practitioner. Examines the affected area for protrusions, contusions, and other factors affecting fitting and placing of artificial limbs and orthopedic appliances. Measures the limb or deformity, using calipers, tape measure, ruler, and other measuring devices and instruments, and makes plaster casts of limbs or deformity to determine the type of and specifications for braces or artificial limbs to be made. Takes the finished article and fits the appliance or limb on the patient making necessary adjustments and instructs the patient in the proper use of the device.

4. Health Physicist - (D. O. T. 079.021) - Devises and directs research, training, and monitoring programs to protect plant and laboratory personnel from radiation hazards. Conducts research to develop inspection standards, radiation exposure limits for personnel, safe work methods, and decontamination procedures, and tests surrounding areas to insure that radiation is not in excess of permissible standards. Directs testing and monitoring of equipment and recording of personnel and plant area radiation exposure data and requests bioassay samples from individuals believed to be exposed. May advise public authorities on methods of dealing with radiation hazards and procedures to be followed in radiation incidents and assists in civil defense planning.

5. Audiologist - (D. O. T. 079.108) - Specializes in diagnostic evaluation, habilitative and rehabilitative services, and research related to hearing. Determines the range, nature, and degree of hearing function related to the patient's auditory efficiency (communication needs) using electro-acoustic instrumentation such as pure-tone and speech audiometers and galvanic skin response equipment. Coordinates audiometer results with other diagnostic data such as educational, medical, social, and behavioral information. May act as a consultant to educational, medical, and other professional groups.
6. Audiometrist - (D. O. T. 073.368) - Administers pure-tone audiometric scanning tests under the supervision of the audiologist or physician to individuals or groups. Refers individuals to the audiologist or physician for interpretation of test results and the determination of need for a more definitive hearing examination.
7. Chiropractor - (D. O. T. 079.108) - Adjusts the spinal column and other articulations of the body to prevent disease and to correct abnormalities of the human body believed to be caused by interference with the nervous system. Manipulates the spine or other involved areas and may utilize supplementary measures such as exercise, water, light, and heat therapy.
8. Chiropractor's Assistant - (D. O. T. 079.368) - Aids the chiropractor during the physical examination of patients, gives specified office treatments, and keeps patient's records. Gives physiotherapy treatments such as diathermy, galvanics, or hydrotherapy, following the direction of the chiropractor. Takes and records the patient's temperature and blood pressure, assists in x-ray procedures, and gives first aid when necessary.
9. Naturopathic Doctor - (D. O. T. 079.108) - Diagnoses, treats, and cares for patients using a system of practice that bases its treatment of all physiological functions and abnormal conditions on natural laws governing the body. Utilizes physiological, psychological, and mechanical methods such as air, water, light, earth, phytotherapy, food and herb therapy, psychotherapy, electrotherapy, physiotherapy, minor and orificial surgery, mechanotherapy, naturopathic corrections and manipulation, and all natural methods or modalities, together with natural medicines, natural processed foods, and herbs and nature's remedies.
10. Hearing Clinician - (D. O. T. 079.108) - Examines and provides remedial services for patients with communicative disorders related to hearing working under direction of audiologist. Administers initial pure-tone and speech audiometric examinations to

determine hearing thresholds. Coordinates or conducts school hearing conservation programs and counsels patients, family, and teachers concerning hearing disabilities.

11. Optometrist - (D.O.T. 079.108) - Examines eyes to determine visual efficiency and performance by means of instruments and observation and prescribes corrective procedures. Conserves, improves, and corrects vision through use of lenses, prisms, orthoptic exercises, visual training, and control of visual environment. May specialize in prescribing and fitting contact lenses and subnormal vision devices.

12. Podiatrist - (D.O.T. 079.108) - Diagnoses and treats diseases and deformities of the human foot. Diagnoses foot ailments such as tumors, ulcers, fractures, skin and nail diseases, and congenital or acquired deformities utilizing such medically accepted methods as urinalysis, blood tests, and x-ray analysis. He treats deformities such as flat or weak feet and foot imbalance by mechanical and electrical methods such as whirlpool or paraffin baths and short wave and low voltage currents. Treats conditions such as corns, calluses, ingrowing nails, tumors, shortened tendons, cysts, and abscesses by surgical methods including suturing, medication, and administration of local anesthetics.

13. Speech and Hearing Clinician - (D.O.T. 079.108) - Examines and provides remedial services for persons with speech and hearing disorders. Instructs speech handicapped persons in the development of desirable speech habits by training them in control of articulation and voice. Administers initial pure-tone and speech audiometric examinations to determine hearing thresholds. Provides audiological services such as speech reading and auditory training, and remedial speech services for disorders such as stuttering, and articulatory problems associated with such impairments as cleft plates, cerebral palsy, and aphasia.

14. Speech Clinician - (D.O.T. 079.108) - Examines and provides remedial services for patients with speech and language disorders. Provides remedial services for speech disorders such as stuttering, voice disorders, and articulatory and speech problems associated with impairments such as cleft palates, cerebral palsy, and aphasia. May counsel patients, their families, or teachers concerning social and psychological problems associated with speech disabilities.

15. Speech Pathologist - (D.O.T. 079.108) - Diagnoses, treats, and performs research related to speech and language problems. Diagnoses speech and language disorders by evaluating etiology.

Treats language and speech impairments such as aphasia, stuttering, and articulatory problems of organic and nonorganic etiology. Plans directs or conducts remedial programs designed to restore or improve communications efficiency. Provides counseling and guidance to speech and language handicapped individuals.

16. Manual-Arts Therapist - (D. C. T. 079.128) - Instructs patients in prescribed manual arts activities to prevent anatomical and physiological deconditioning and assists in maintaining, improving, or developing work skills. Teaches, by means of actual or simulated work situations, activities such as woodworking, photography, metalworking, agriculture, electricity, and graphic arts.

17. Music Therapist - (D. C. T. 079.128) - Plans, organizes, and directs medically prescribed musical activities as part of care and treatment of patients. Directs and participates in instrumental and vocal musical activities designed to meet the patients needs such as solo or group singing, listening to selected recorded music or music quiz programs, playing in bands or orchestras, or attending concerts given by visiting musicians or patients.

18. Occupational Therapist - (D. O. T. 079.128) - Plans, organizes, and participates in medically oriented occupational programs in hospitals or similar institutions to rehabilitate patients who are physically or mentally ill. Utilizes creative and manual arts, recreational, educational, and social activities, prevocational evaluation and training in everyday activities such as personal care and homemaking.

19. Occupational Therapy Aid - (D. C. T. 079.368) - Assists the Occupational Therapist in administering medically oriented occupational programs to assist in rehabilitating patients in hospitals and similar institutions. Instructs patients in manual and creative arts, games, crafts, and other activities.

20. Recreational Therapist - (D. O. T. 079.128) - Plans, organizes, and directs medically approved recreation programs for patients in hospitals and other institutions. Directs and organizes such activities as adapted sports, dramatics, social activities, and arts and crafts, regulating contents of the program in accordance with the patient's capabilities and interests.

21. Industrial Hygienist - (D. C. T. 079.188) - Conducts health programs in industrial plants or similar organizations to eliminate or control occupational health hazards and diseases. Collects samples of dust, gases, vapors, and other potentially toxic materials for analysis and investigates the adequacy of ventilation,

exhaust equipment, lighting, and other conditions which may affect employee health.

22. Orientation Therapist for the Blind - (D. O. T. 079.228) -

Assists newly blinded patients to achieve personal adjustment and maximum independence through training in techniques of daily living. Trains patients to orient to physical surroundings and to travel alone, with or without cane, through use of a variety of actual or simulated travel situations. Teaches patients to attend to such personal needs as eating, grooming, dressing, and using dial telephones and teaches patients to read and write Braille.

23. Podiatrist's Assistant - (D. O. T. 079.368) - Prepares the patients for treatment, sterilizes instruments, arranges appointments, keeps patients' records, prepares correspondence, and collects fees to assist the podiatrist. May assist in administering Whirlpool or heat treatments, preparing dressings, and developing x-ray.

24. Corrective Therapist - (D. O. T. 079.368) - Provides medically prescribed program of physical exercises and activities to prevent muscular deconditioning resulting from long convalescence or inactivity due to chronic illness. Utilizes any one or a combination of assistive, or free movement exercises, utilizing stationary bicycles, weights, pulleys, rowing machines, walking bars, or hydrogymnastics. Instructs patients in the use, function, and care of prostheses and devices such as braces, crutches, or canes, and in the use of manually controlled vehicles.

25. Orthoptist - (D. O. T. 079.378) - Teaches persons with correctable focusing defects to develop and use binocular vision. Measures visual acuity, focusing ability, and eye-motor movement of eyes, separately and jointly, using such equipment as telebinoculars, tachistoscopes, disparators, amblyscopes, and prisms. Develops visual skills in eye-hand coordination, near-visual discrimination, and depth perception using developmental glasses.

26. Inhalator Therapist - (D. O. T. 079.368) - Sets up and operates various types of oxygen equipment such as iron lung, oxygen tents, resuscitators, and incubators to administer oxygen and other gases to patients.

27. Physical Therapist - (D. O. T. 079.378) - Treats patients with disabilities, disorders, and injuries to relieve pain, develop or restore functions, and maintain maximum performance using physical means such as exercise, massage, heat, water, light, and electricity as prescribed by the physician. Applies diagnostic

and prognostic muscle, nerve, joint, and functional ability tests. He directs and aids the patient in active and passive exercises, muscle re-education, and gait and functional training utilizing pulleys and weights, steps, and inclined surfaces.

28. Contact-Lens Technician - (D.O.T. 299.478) - Fits contact lenses on customers. Obtains lens according to diameter, curvature, and power of the lens as stated on the prescription of the Optometrist, and instructs the customer in wearing the lenses.

29. Artificial-Plastic-Eye Maker - (D.O.T. 713.281) - Forms the wax impression of the patient's eye socket, makes the plastic artificial eyes, and fits them into the patient's eye socket. Finishes and fits the artificial eye and compares it with the natural eye.

30. Mounter and Repairman (Optical Goods) - (D.O.T. 713.281) - Mounts lenses, adjusts frames, and repairs damaged frames of combination and rimless eyeglasses according to prescription specification. Repairs damaged frames by performing tasks such as soldering broken metal bridges and replacing damaged temples.

J. MEDICAL PROFESSIONS - The medical professions are concerned with treating ailments and abnormalities of the whole body. They all require strict academic preparation within the medical field and licensure by medical boards. There are a number of specialized fields in medicine and a number of supporting professions which are discussed below.

1. Medical Doctor - (D.O.T. 070.108) - Is the familiar family doctor. In a single day, he may be called upon to do everything from caring for a baby with possible pneumonia to treating the victim of a traffic accident or dealing with a case of chronic heart disease. Modern medicine has become so complex that it is no longer possible for a single physician to know the latest findings in all fields. As a result, in recent years the proportion of specialists, as compared to "G. P. 's", has been increasing, and today more than half of all the physicians in private practice either limit themselves to work in one speciality or else devote a considerable part of their time to a specialty. Among those specialized fields with the D.O.T. number 070.108 are anesthesiology, local and general anesthetics; dermatology, skin diseases; internal medicine, diseases that cannot be treated surgically; neurologic surgery, surgery of the nervous system; neurology, the nervous system and its diseases; obstetrics and gynecology, management of childbirth and women's diseases; occupational medicine, conditions relating to industry and other places of employment; ophthalmology, treatment of the eye and its diseases; orthopedic surgery, preservation and restoration of bony structures, joints, and related

structures; otolaryngology, diseases of the ear, nose, and throat, pathology, study of the structural changes which cause, or are caused by, disease; pediatrics, medical care of children; physical medicine and rehabilitation, treatment by the application of heat, cold, water, electricity, exercise, etc., and the use of the methods in restoring useful activity to the disabled; plastic surgery, surgical repair of soft tissue, including the transfer of tissues from one part to another; proctology, diseases of the rectum; psychiatry, diseases and disorders of the mind; physiatrist, clinical and diagnostic use of physical agents and exercises to provide physiotherapy for physical, mental, and occupational rehabilitation of patients; radiology, diagnosis and treatment of disease by means of x-ray, radium, and other radioactive sources; urology, diseases and abnormalities of the urinary and urogenital tract; cardiology, treats diseases of the heart and its functions; osteopathy, diagnoses, prescribes for, and treats diseases of the human body, relying upon medical, surgical, and manipulative therapy.

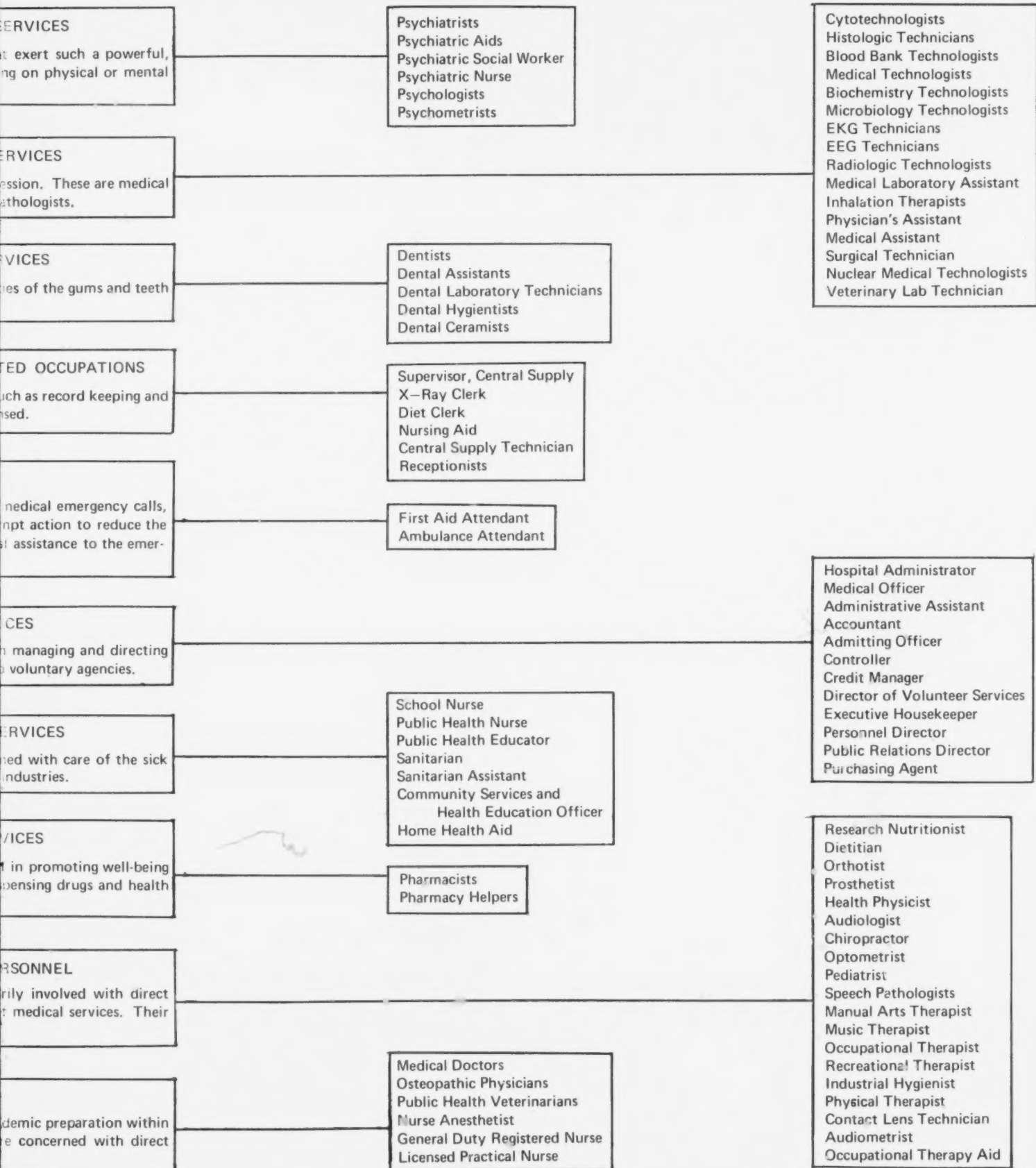
2. Public Health Veterinarian - (D. O. T. 073.108) - Investigates, prevents, and controls animal diseases communicable to man through direct contact, insects, food, or contamination of environment.
3. General Duty Nurse - (D. O. T. 075.378) - Renders general nursing care to patients in hospitals, infirmaries, sanitariums, or similar institutions. Administers prescribed medication and treatments in accordance with approved nursing techniques. Prepares equipment and aids the physician during treatments and examinations of patients. May assist with operations and deliveries by preparing rooms sterile instruments, equipment and supplies, and handling in order of use. May serve as leader for a group of personnel rendering nursing care to a number of patients.
4. Nurse Anesthetist - (D. O. T. 075.378) - Administers intravenous, spinal, and other anesthetics to render persons insensible to pain during surgical operation, deliveries, or other medical and dental procedures. Informs the physician of the patient's condition during anesthesia and may administer oxygen or initiate other emergency measures to prevent surgical shock.
5. Office Nurse - (D. O. T. 075.378) - Cares for and treats patients in the office as directed by the physician and prepares patients for and assists with examinations. Administers injections, dresses wounds and incisions, interprets physician's instructions to patients, assists with emergency and minor surgery, and performs related tasks as directed.

6. Industrial Nurse - (D. O. T. 075.378) - Provides nursing service to employees or persons who become ill or suffer an accident on the premises of department stores, factories, or other establishments and gives first aid to injured persons. Attends to subsequent dressings of employees' injuries and keeps records of persons treated and prepares accident reports for compensation or other purposes. Gives information to employees in health education and illness prevention.

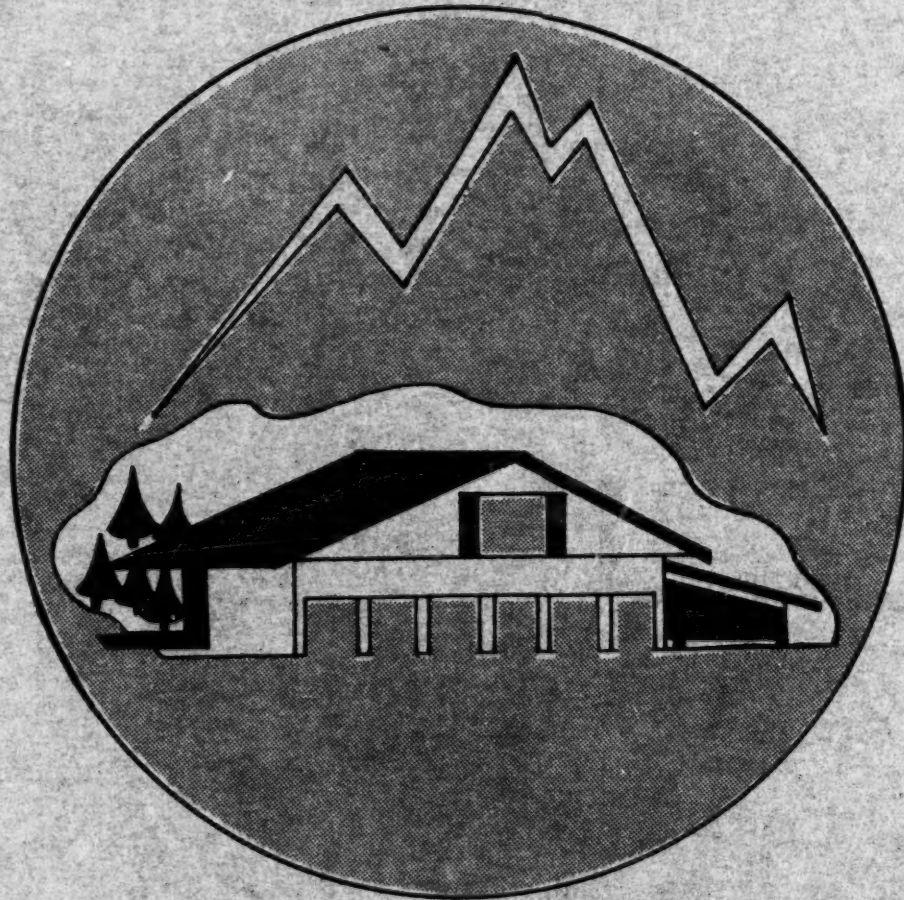
7. Licensed Practical Nurse - (D. O. T. 079.378) - Cares for patients and children in private homes, hospitals, sanitariums, industrial plants, and similar institutions. Bathes and dresses bed patients, combs hair, and otherwise attends to their comfort and personal appearance. Cleans rooms, changes bed linens, takes and records temperature, pulse, and respiration rate. Gives medications as directed by the physician or General Duty Nurse. Is also known as a Licensed Vocational Nurse.

HEALTH





HOSPITALITY AND RECREATION



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HOSPITALITY (TOURISM) AND RECREATION

I. INTRODUCTION

The overwhelming desire to enjoy oneself through recreation or tourism is one of man's prominent incentives and/or obsessions. Through the years, as wages have increased and the work-week has become shorter, man has had more time for relaxation and pleasure. It is this greater amount of time and man's determination for enjoyment which provide occupations in the fields of recreation and tourism for a significant percentage of our population. Many occupations that were once part-time and somewhat insignificant have become full-time, indispensable tasks.

The terms "hospitality" and "recreation" should first be defined to enable one to understand the broad categories that they encompass. Hospitality refers to tourism in its broadest scope; i.e., it includes every occupation which aids individuals or groups in making the actual plans for a vacation and/or tour and involves all transportation personnel who have contact with the passenger or tourist. An example might prove relevant: the airline stewardess has personal contact with the tourist, and her primary function is to contribute to his comfort and gratification, whereas the pilot is concerned only with flying the aircraft. Although both of these occupations are categorized under the classification TRANSPORTATION, only the airline stewardess can be cross-referenced with HOSPITALITY AND RECREATION.

Once the tourist has arrived at his destination, the term recreation becomes more relevant. RECREATION embraces all personnel who enable the tourist to be entertained and or amused, whether it be the marine-mammal handler, the museum guide, the strip-tease artist, or the motor boat operator. Thus, many occupations which at first glance are apparently irrelevant do, in fact, fall in the cluster HOSPITALITY AND RECREATION. Because of obvious overlapping of occupations in different clusters, references will be made in the text to the other cluster where added information may be found.

II. METHODOLOGY

The method employed in researching this cluster first involved general

reading in the areas of recreation and tourism. Once the scope of the project was determined, it was necessary to categorize the cluster into specific families. Several rather recent publications aided in determining the families, but of utmost significance was the Dictionary of Occupational Titles, which gave the titles of innumerable occupations and a general description of each. The following bibliography includes all consulted material:

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- Jenny, John H. Introduction to Recreation Education. W. B. Saunders Company (Philadelphia, 1955).
- Jones, Anna May. Leisure Time Education. Harper and Brothers (New York, 1946).
- Lipovetz, Ferd John. Recreation Handbook of School and Community Recreation, Organization, and Administration. Burgess Publishing Company (Minneapolis, 1950).
- Nash, Jay B. Opportunities in Physical Education, Health and Recreation. Vocational Guidance Manuals (New York, 1953).
- National Recreation Association. Recreation While on the Mend in Hospital and at Home. (New York, 1944).
- Petrill, Jack. After the Whistle Blows. The William-Frederick Press (New York, 1949).
- Short, Don. Opportunities in Travel. Vocational Guidance Manuals, Inc. (New York, 1953).
- U.S. Dept. of Agriculture, Soil Conservation Service. An Appraisal of Potentials for Outdoor Recreational Development. (Temple, Texas, 1967).
- U.S. Dept. of Labor. Dictionary of Occupational Titles, Third Ed., Vols. I and II. U.S. Govt Printing Office (Washington, D.C., 1965).
- Vettiner, Charles J. A New Horizon of Recreation. (Louisville, 1956).

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual Job Families, with a listing and discussion of the function of individual occupations, are listed below:

A. COMMERCIAL AND NON-COMMERCIAL TRAVEL BUREAUS - Travel bureaus, both commercial and non-commercial, provide the public with travel information and attempt to promote good will. These bureaus differ from the travel agency in that the latter recommends specific trips, resorts, or modes of transportation and arranges accommodations, whereas the travel bureau simply provides information about a designated area, such as a city, an area encompassing several cities, or even several states (The Pacific Northwest Travel Association comprises the states of Washington, Oregon, Idaho, and Montana). These bureaus generally promote and encourage travel to a specific area through advertising, publicity, and the information provided at the bureau itself. By maintaining libraries of information and photographs of the area, the bureau personnel enable visitors to receive a representative outlook on the particular region.

The information bureau is usually staffed by highly trained personnel who have, in close proximity, the answers to most of the questions asked by tourists. They know the locations of restaurants, theatres, clubs, etc., and are able to give coherent directions. The bureau personnel also include some untrained individuals who maintain the facilities and serve as typists, telephone operators, etc.

This classification (Travel Bureaus) includes all occupations which aid in providing the tourist with information about a specified area. This spans the positions from bureau agent to the librarian to the photographer who takes scenic pictures of the area.

1. Artist - (D.O.T. 735.887) - Paints and/or draws scenic landscapes, still life, abstract and similar designs for travel bureau or agency brochures, manuals, guides, etc. See FINE ARTS AND HUMANITIES.
2. Information Clerk (Travel Bureau) - (D.O.T. 237.368) - Provides travel information for tourists. Describes routes, services, and available accommodations. May suggest certain attractions, etc. May also be designated Typist, Telephone Operator.
3. Librarian (Travel Bureau or Agency) - (D.O.T. 100. series) - Keeps library of travel bureau or agency brochures, pamphlets, manuals, maps, etc. Locates and/or sends travel information upon request. May also serve as Information Clerk, Typist, Telephone Operator. See PUBLIC SERVICE.
4. Lodging Facilities Attendant - (D.O.T. 329.878) - Performs various

clerical, housekeeping, and maintenance duties at a tourist camp, motel, trailer park, vacation resort, or lodge. Gives information to guests concerning services and facilities available. Registers guests, assigns cabins, rooms, or trailer spaces, and collects rents. Sweeps and mops floors, mows lawn, maintains outside recreational areas, and performs other general cleaning and maintenance duties.

5. Photographer - (D.O.T. 143. series) - Photographs scenic landscapes, animals, etc., to include in travel bureau or agency brochures, manuals, guides to illustrate scenic views. See FINE ARTS AND HUMANITIES.

6. Public Relations Man - (D.O.T. 165.068) - Plans and conducts public relations program designed to procure publicity for travel bureaus through such media as magazines, newspapers, radio, and television. Selects and assembles publicity material that accords with organizational policy. Writes scripts for radio and television presentation, assigns and approves art work, participates in community and civic programs. May edit material and direct preparation of organization publications. May be designated as Publicity Director, Promotion Manager, Publicity Manager, Press Agent, Promotion Man, Public-Information Writer, Publicity Man, Publicity Agent, Publicity Supervisor, Publicity Writer, Public-Relations Counselor. See BUSINESS AND OFFICE.

7. Transportation Clerk - (D.O.T. 242.368) - Provides travel information and arranges accommodations for tourists. Discusses routes, time schedules, rates, and types of accommodations with patrons to determine their preferences and makes reservations. May arrange for visas and other documents required by foreign travelers. May contact individuals and groups to sell package tours on own initiative. See TRANSPORTATION.

8. Travel-Accommodation Appraiser - (D.O.T. 168.268) - Inspects and rates hotels, motels, restaurants, and resorts for cleanliness, quality of service, type of accommodations provided, rates charged, and related factors, and classifies each establishment according to travel accommodation standards, such as are used by the American Automobile Association. May sell advertising space in publications. May be designated Touring Reporter, Travel-Guide Representative.

9. Travel Counselor - (D.O.T. 237.168) - Plans trips for members of clubs. Marks suitable roads and possible detours on road map; indicates points of interest, restaurants, hotels, or other housing accommodations, and emergency repair services available during the trip. Reserves accommodations by telephone, etc.; consults hotel

directories, road maps, circulars, time-tables, and other sources to obtain current information.

10. Writer - (D.O.T. 131. series) - Prepares manuals, brochures, etc., in clear, concise language to provide tourist with information about area to be toured. See FINE ARTS AND HUMANITIES.

B. TRAVEL AGENCIES - The travel agency serves many of the same functions as the travel bureau. It not only provides the traveler with information about vacation areas but informs him of tours and accommodations that the agency can arrange for him. The personnel in both the travel bureau and the travel agency are quite similar; thus, reference to Commercial and Non-Commercial Travel Bureaus in this pamphlet might prove beneficial. All occupations which are concerned with the operation and maintenance of travel agencies are included in this category.

1. Advertising and Publicity Personnel - Plans, writes, and conducts advertising for travel bureaus and agencies. Selects and assembles publicity material that accords with presenting good image of tourist agency and tours to be provided. Writes, edits, and publishes information in form of pamphlets, brochures, manuals, etc. May also be designated Writer, Artist, Photographer. See MARKETING AND DISTRIBUTION and FINE ARTS AND HUMANITIES.

2. Hotel Representative - Supplements work of travel agents but usually does not compete with them. Makes direct bookings for hotels, keeps a current listing of available accommodations, mails literature, and otherwise acts just as the hotel's own promotion staff would act. Also sends out trained workers to canvass commercial travel agents, service bureaus, and other agencies to make sure that such agents and bureaus have full information regarding the clients of the firm.

3. Information Clerk - (D.O.T. 237. series) - Gives general information on tours, cruises, fares, hotels, and their rates, sightseeing trips, and places of interest.

4. Librarian - (D.O.T. 100. series) - See Librarian, Commercial and Non-Commercial Travel Bureaus, this pamphlet. Also see PUBLIC SERVICE.

5. Publicity, Advertising, and Clerical Staff - (D.O.T. 165.963) - See Travel Bureaus and Travel Agencies this pamphlet for these occupational listings. Also see COMMUNICATIONS AND MEDIA.

6. Sales Agent or Agency Representative - Is "follow-up" man who

calls on prospective individual travelers or business executives to sell agency service to their firms, or on officials of large organizations for convention business. May be called upon to explain to groups or individuals the type of arrangements that will be made for a trip, the facilities provided, the type of personal service they will receive, and the type of food they will get.

7. Ticket Clerk - (D.O.T. 237. series) - Issues tickets and collects money. Deals not only with the public but also with the transportation companies involved. Must telephone or write the transportation or sightseeing company, hotel, resort, or camp and confirm the sale of the space to the individual involved. Is empowered to issue tickets, collect payments, collect taxes, and deduct the agency's commission.

8. Travel Advisor - Actually maps the trip, on the basis of information given by the client as to time available, number of people involved, their ages, the money available, and preferences as to the type of trip. Makes suggestions, giving expert opinion on ideas presented.

9. Travel Agency Clerk - (D.O.T. 205. series) - Answers telephone inquiries, answers mail, keeps records, and does general office work.

10. Travel Agency Supervisor and Executive - Attends to overall business concerns of the agency, depending upon its size. May also work as Agency Representative.

11. Travel Agent - (D.O.T. 237. series) - Sells the services of the railroads, bus lines, airlines, steamship lines, sightseeing companies, hotels, resorts, camps, and the larger agents or travel wholesalers directly to the public. Keeps account of tours, etc., provided by transportation companies and advertises accordingly. May plan trip for tourists and arrange accommodations.

C. TRANSPORTATION - A definition of transportation as it relates to hospitality, or tourism, is mandatory to enable one to distinguish between the transportation personnel whose principle duty is passenger or tourist comfort and the personnel who are concerned only with operation of the aircraft, ship, bus, etc. Reference to the primary cluster TRANSPORTATION will aid in defining all transportation personnel. However, this particular category has relevance only to the personnel who are concerned with the passengers' comfort. Thus, the airline stewardess falls into this category of TRANSPORTATION, whereas the airplane pilot is included in the broad area of TRANSPORTATION.

1. Passenger Agents and Clerks - Distributes company literature, notifies travel-information organizations of all changes in rates,

schedules, equipment, and accommodations. Must handle the vast clerical job of issuing tickets, collecting money, assigning space, giving refunds, making cancellations, and adjusting complaints. Provides estimates to the operating divisions of equipment needed for every service, for holiday rushes and vacation seasons, for conventions, and special events. May be designated Railroad Passenger Department Agents and Clerks, Steamship Passenger Department Clerks and Agents, Airline Clerks and Agents. See TRANSPORTATION.

2. Purser - Checks and is responsible for protection of passengers' valuables left in his office, arranges for their seats in the dining room, purchases the deck chairs and cushions for duration of the voyage, cashes traveler's checks, or changes their money to foreign currency. See TRANSPORTATION.

3. Stewardess (Airline) - Cares for comfort of passengers, provides coffee, snacks, lunches, information, etc. Must be expert swimmer and accomplished linguist. See TRANSPORTATION.

4. Steward (Deck) - Arranges for comfort of the passengers on deck, sets up deck chairs, arranges cushions, blankets, and pillows, provides bridge tables and cards when desired, and generally caters to the needs of the traveler. See TRANSPORTATION.

5. Tour Conductor - Points out historical or scenic locations to tourists, gives background of area, and answers questions.

6. Tour Director - Accompanies touring group on trip, provides information to tourists, and arranges for emergency return flights, etc.

7. Tourist Recreation Director or Supervisor - Directs or supervises recreation personnel on board ship and at destination.

D. PUBLIC, INDUSTRIAL, AND PRIVATE RECREATION (COMMERCIAL AND NON-COMMERCIAL) - Because of the great expanse that this category encompasses, it is necessary only to state that any occupation concerned with application of the theoretical or practical aspects of athletics and sports, with entertainment (such as a hypnotist, wire walker, show girl), with bowling or billiard alleys, golf courses, tennis courts, or any other related activity, with operating games of chance or skill or other types of amusement equipment (i.e., the ferris wheel, roller coaster, merry-go-round), running fairs, carnivals, circuses, or amusement parks, with running games of chance in gambling establishments, with taking tickets, distributing programs, and escorting patrons to seats in public places, and any other occupation concerned with amusement and recreation services falls into the category of Public, Industrial, and Private Recreation.

1. Athlete Manager - (D.O.T. 153.118) - Manages affairs of athlete by negotiating with promoters or others to settle contracts and business matters and directs training. Prescribes exercises, rest periods, and diet to be followed by athlete. Directs athletic trainer in conditioning athlete. Gives directions to protege in athletic techniques. Determines strategy to be followed by athlete in competition with others.
2. Athletic Director - (D.O.T. 153.118) - Plans, administers, and directs athletic activities; interprets and participates in formulating extramural athletic policies. Employs and discharges athletic employees on own initiative or at direction of board in charge of athletics. Assumes responsibility for athletic publicity. Oversees and directs athletic staff. Prepares budget estimates and is responsible for all expenditures and reports.
3. Athletic Equipment Custodian - (D.O.T. 969.387) - Keeps stock of new and used athletic supplies, such as balls, gloves, bats, shoes, and uniforms, and issues supplies to players. Packs and unpacks supplies for road trips and insures that arrangements are made for their transportation. May wash soiled uniforms and other supplies in automatic washing machine or may arrange to have them laundered.
4. Athletic Team Manager - (D.O.T. 153.118) - Negotiates for players and directs professional athletic team: Directs conditioning and training of players. Selects players for positions on team and coaches them in techniques of game. Determines game strategy. Discusses and bargains with other clubs to sell or trade players. May also participate on team managed and be designated accordingly as Player-Manager.
5. Athletic Trainer - (D.O.T. 153.228) - Improves physical fitness of athletes for participation in various sports. Prescribes routine and corrective exercises to strengthen muscles. Recommends special diets to build up health and reduce over-weight persons. Massages parts of players' bodies to relieve soreness, strains, and bruises. Renders first aid to injured persons. May make arrangements for hotel accommodations and for transportation to other places for sports participants.
6. Professional Athlete - (D.O.T. 153.348) - Participates in competitive athletic events, such as football, boxing, hockey, tennis, golf, baseball, basketball and soccer for personal enjoyment and monetary gain. (Competitors become professional when they are contracted to compete because of their athletic skills and when they enter

events for which fees are charged and monetary awards are given.

7. Umpire - (D.O.T. 153.268) - Officiates at sporting events and observes actions of participants in events to detect infractions of rules, and makes final decisions on disputable matters according to established regulations, consulting opposing teams or players when required. When concerned only with determining validity of goals, order of participants that reach finish line, or out-of-bound plays, may be designated accordingly as Finish Judge, Goal Umpire, Lineman.

8. Automobile Racer - (D.O.T. 153.248) - Drives automobile racing car in competition road races, which includes participation in speed and elimination trial races to qualify car for race, analysis of speed and position of other cars to determine when and where to drive car so as to be in favorable position to win. May perform maintenance work on car.

9. Acrobat - (D.O.T. 159.248) - Entertains audience by performing difficult and spectacular feats, such as leaping, tumbling, and balancing, alone or as a member of a team. Originates act or adapts stock presentations. May use equipment, such as chairs and teeter board. May juggle various articles. May be designated Acrobatic Juggler - (D.O.T. 159.348). May perform feats requiring bodily contortions.

10. Acrobatic Rigger - (D.O.T. 964.884) - Erects equipment for aerial and acrobatic acts in show, such as circus, variety show, and carnival, working as member of a crew by drilling holes in the floor of the stage or platform with electric drill and fastening metal floor plates to hold vertical steel rods. Lowers and raises trapezes and nets during performance.

11. Aerialist - (D.O.T. 159.248) - Performs gymnastic feats of skill and balance while swinging on trapeze, turning somersaults, or executing flying stunts alone or as a member of a team.

12. Artist and Repertoire Man - (D.O.T. 159.168) - Selects recording artists and musical selections for production of phonograph records, according to familiarity with popular tastes in music and knowledge of vocal and instrumental techniques, attempting to select most appropriate artist for each recording. May direct recording sessions, audition records and musical artists, and promote sale of records by personal appearances and contracts with broadcasting personalities.

13. Circus Agent (Business Agent) - (D.O.T. 101.113) - Circus-Contracting Agent, Impresario, and Theatrical Production Manager

are similar occupations. Manages affairs of entertainers and negotiates with booking agent or producers to arrange for engagements. Advises clients concerning contracts, wardrobe, and effective presentation of act, using knowledge of show business.

14. Circus Foreman - (D.O.T. 964.138) - Supervises and coordinates activities of workers engaged in cleaning, moving equipment, and erecting tents and rigging in circus, carnival, or other exhibition, performing duties as described under Foreman.

15. Circus Laborer - (D.O.T. 969.887) - Performs variety of tasks in cleaning floors and moving equipment for amusement show, such as fair, circus, or carnival. May work as member of team to erect and dismantle canvas tents and place seats.

16. Circus Trainmaster - (D.O.T. 910.138) - Supervises and coordinates activities of workers engaged in loading and unloading circus animals and equipment on and off train.

17. Clown - (D.O.T. 159.048) - Entertains audience by appearing in clown costume and makeup and performing original or stock comedy routines.

18. Comedian - (D.O.T. 159.048) - Attempts to make audience laugh by telling jokes, delivering comic lines, singing humorous songs, performing comedy dances or walks, or facial contortions, wearing funny costumes, or resorting to any similar device to amuse his audience. May do impersonations.

19. Mermaid - (D.O.T. 159.348) - Performs underwater ballet routines to entertain spectators, using air line and utilizing simultaneous techniques of swimming and dancing. May serve as life guard, sell tickets, or perform other duties when not participating in show.

20. Mime - (D.O.T. 159.048) - Presents serious, humorous, or burlesqued interpretations of emotions, dramatic actions, and various situations through body movements, facial expressions, and gestures.

21. Ring Master - (D.O.T. 159.368) - Blows whistle in circus ring as signal for performers to begin or end their acts for entertainment of audience.

22. Showman - A term for any person, usually producer, engaged in such fields of entertainment as carnivals, night clubs, and theaters, who exhibits a flair for creating dramatic situations for emotional effects on audience and for publicity effects on public.

23. Stunt Man - (D.O.T. 159.348) - Performs dare-devil feats, such as diving stunts, perilous rides, or spectacular jumps for dramatic productions. May also be designated as Thrill Performer - (D.O.T. 774.381), Wire Walker - (D.O.T. 159.348), Fire Eater - (D.O.T. 159.884).

24. Astrologer - (D.O.T. 159.848) - Forecasts future trends or events about persons, countries, companies, or animals by interpreting significance of planetary positions when charted on a horoscope.

25. Fortune Teller - (D.O.T. 159.848) - Professes to tell past, present, or future events by extraordinary intuitive or spiritual insight that enables him to perceive things out of range of ordinary perception. May also be designated as Card Reader, Crystal Gazer, Palmist, Seer, Tea-Leaf Reader.

26. Graphologist - (D.O.T. 159.848) - Professes to judge patron's character by studying his handwriting, observing in detail formation of letters.

27. Hypnotist - (D.O.T. 159.048) - Entertains audience by inducing hypnotic trance in subjects, occasionally using members of audience as subjects and commanding hypnotized subject to perform specific tasks.

28. Magician - (D.O.T. 159.048) - Performs original and stock tricks of illusion and sleight-of-hand to entertain and mystify audience. (A prestidigitator is a magician who entertains an audience by performing sleight-of-hand tricks, using such props as cards and cigarettes.) May use members of audience in act and remove their jewelry, wallets, or watches without their knowledge.

29. Mind Reader - (D.O.T. 159.848) - Entertains audience by demonstrating professed ability to perceive another person's thoughts without normal means of communication, usually using members of his audience as subject and working alone or as member of act.

30. Physiognomist - (D.O.T. 159.848) - Professes to read character from appearances of individuals, classifying persons according to physical traits, such as size and shape of lips, and texture of skin. Also, may include Phrenologist, who professes to judge character by shape of individual's head.

31. Ventriloquist - (D.O.T. 159.048) - Entertains audience by speaking in such manner that voice appears to come from source

other than own vocal chords, frequently from dummy or hand puppet. Changes positions of dummy or puppet during performance to give illusion of voice and movement.

32. Puppeteer - (D.O.T. 159.048) - Originates puppet show and moves strings or wires of puppets to animate them for entertainment of audience. Carves or shapes parts of puppet, sews together articles of clothing, and assembles puppets, using wire, string, and handtools. Talks or sings during performance, giving illusion of voice to puppets.

33. Show Girl - (D.O.T. 159.848) - Parades across stage to display costumes and provide background for chorus line to entertain audience. Is usually selected for tall, statuesque beauty, and is not required to dance.

34. Song and Dance Man - (D.O.T. 159.048) - Entertains audience by singing popular songs and performing dance routine independently or with partner. Usually incorporates comedy lines in act.

35. Strip-Tease Artist - (D.O.T. 159.848) - Entertains audience by gradually divesting herself of clothing to accompaniment of music, displaying feminine assets in teasing or provocative manner. Originates own act or adapts stock presentations for act. May sing and tell jokes. May dance while stripping, performing sensuous gyrations. May be designated Belly Dancer, Shake Dancer, Exotic Dancer, Stripped

36. Waiter-Entertainer - (D.O.T. 159.848) - Entertains and serves patrons of eating and drinking establishments, such as cocktail lounge, night clubs, restaurants, or taverns. Serves beverages and food to patrons of establishment and dances, sings, or plays musical instruments to provide entertainment for customers. May be designated according to type of entertainment as Dancing Waiter, Singing Waiter, Singing Waitress.

37. Usher - (D.O.T. 344. series) - Includes occupations concerned with taking tickets, distributing programs, and escorting patrons to seats in public places. May be designated as Head Usher - (D.O.T. 344.138), Ticket Taker - (D.O.T. 344.868), Lobby Man - (D.O.T. 344.878), Press-Box Custodian, Spot Man, Usher.

38. Snake Charmer - (D.O.T. 159.848) - Entertains audience by exhibiting skill in controlling behavior of venomous snakes, usually with music, to make them perform tricks or feats as part of a specialty act.

39. Baton Twirling Instructor - (D.O.T. 159.228) - Instructs drum

majors and majorettes by explaining and demonstrating techniques of baton twirling and execution of dance steps and such acrobatics as cartwheels, somersaults, and handsprings, to be performed in time to music, and in leading marching band through precision drills.

40. Bowling Instructor - (D.O.T. 153.228) - Teaches individuals or groups of persons how to bowl by explaining and demonstrating techniques and methods of bowling. Explains bowling rules and regulations and method of keeping score.

41. Ice Skating Instructor - (D.O.T. 153.228) - Instructs individuals or groups in ice skating techniques by demonstration and oral presentation, according to knowledge of skating principles, techniques of body balance, and experience. May participate in exhibitions of figure, dance, and free skating.

42. Judo Instructor - (D.O.T. 153.228) - Conducts individual and group classes in Judo: Lectures on history and purpose of Judo. Lectures and demonstrates use of anatomical knowledge to exploit weak parts of adversary's body. Explains and illustrates principles of leverage, foot action, and body movement.

43. Physical Education Instructor - (D.O.T. 153.228) - Instructs students in physical education activities in educational institution. Teaches field, court, and combative sports to individuals or groups, utilizing knowledge of sport techniques and of physical capabilities of students. Organizes, leads, instructs, and referees indoor and outdoor games, such as volleyball, baseball, and basketball. Instructs individuals or groups in beginning or advanced calisthenics, gymnastics, or corrective exercises, determining type and level of difficulty of exercises, corrections needed, and appropriate movements, applying knowledge of sports, physiology, and corrective techniques. Teaches and demonstrates use of gymnastic apparatus, such as trampolines and corrective weights.

44. Riding Instructor - (D.O.T. 153.228) - Instructs pupils in techniques of horsemanship. Teaches pupils how to mount horse and how to post. Explains and demonstrates methods of controlling horse's actions in walking, trotting, cantering, pacing, and in various other gaits. May drill advanced pupils in art of jumping, horsemanship competitions, and in trail riding.

45. Swimming Instructor - (D.O.T. 153.228) - Teaches individuals or groups swimming and diving techniques, evaluating abilities of students to determine instruction procedures. May give lifesaving and water-safety instruction, such as personal safety, small boat

safety, and safe handling of self-contained underwater breathing apparatus. May teach and referee water games such as water polo and various relays.

46. Ski Instructor - (D.O.T. 153.228) - Instructs and demonstrates techniques of skiing to individuals or groups of persons. Explains walking, turning, stopping, bending knees, and balancing body while on skis. Demonstrates physical exercises required to maintain physical fitness. Recommends ski gear and wearing apparel to use for skiing. Explains safety measures to follow while skiing. Observes persons to detect mistakes and recommends steps to follow to eliminate them. May participate in ski racing and ski jumping competition.

47. Ski Patrolman - (D.O.T. 379.868) - Patrols ski trails and slope areas to provide assistance and protection to skiers and report condition of trails, ski lifts, and snow cover on slopes. Inspects ski lifts to report safety hazards and evidence of damage or wear. May pack snow on slopes after storm or as directed. May be required to give ski instruction. May participate in skiing demonstrations for entertainment of resort guests.

48. Ski-Tow Operator - (D.O.T. 341.865) - Transports skiers up slope or mountainside on lift and collects fares. Pulls levers to start, stop, and adjust speed of lifts, such as rope tow, chair lift, T-bar, or J-bar. Collects or punches ticket for passengers and assists them onto and from lift. May repair and maintain motor and lift equipment.

49. Animal Keeper - (D.O.T. 356.138) - Supervises and coordinates activities of keepers in attending to animals in circus, based on knowledge of characteristics, living habits, and requirements of various animals. May coordinate training of animals for circus performances.

50. Marine-Mammal Trainer - (D.O.T. 159.228) - Trains marine mammals, such as whales, porpoises, and sea lions, to perform tricks for display in sea circus by conducting training programs to develop desired behavior in mammals for public performance, observing mammal for temperament, habits, behavior, and other factors, to evaluate its educability and aptitude for training. Supervises and trains staff in guiding mammals through performance.

51. Marine-Mammal Handler - (D.O.T. 159.328) - Signals or cues trained marine mammals, such as whales, porpoises, and sea lions, to perform tricks for display in sea circus. Studies and rehearses specific signals that are followed by trained mammals in performing repertoire of tricks. Rehearses systematically to establish rapport

with mammals and to acquire skills needed for effective performance. Participates in performance primarily to guide mammals through their acts.

52. Wild Animal Trainer - (D.O.T. 159.228) - Trains wild animals, such as lions, tigers, bears, and elephants, to perform tricks for entertainment of audience at circus or other exhibition, evaluating ability, behavior, and performance of each animal. Originates acts based on performance of animals. May be designated according to type of animal trained, such as Elephant Trainer, Lion Trainer, etc.

53. Dog Trainer - (D.O.T. 159.228) - Trains dogs to perform tricks, hunt, track, obey, protect life and property, run races, or lead the blind by verbal commands or signals by evaluating behavior and performance of each dog. Studies characteristics of each breed to learn how dogs should be handled and to detect signs of sickness. Directs dogs to perform tricks in circus ring or on stage. Rehearses dog, according to script, for motion picture or television film. Also see PERSONAL SERVICE.

54. Horse Trainer - (D.O.T. 153.228) - Trains horses for racing and follows plans adapted to peculiarities of each horse by familiarizing horses with racetrack starting devices, harness, bridles, saddles, and other riding equipment. Conditions horses for competitive racing by exercise and workouts to bring them to their best physical condition. Gives directions to stablemen, horse exerciser, and other workers engaged in grooming, feeding, and the general care of horses. May also train and direct horses to perform tricks for circus or stage audience, to follow routine performed by polo or artillery horses, or to compete at horse shows, evaluating ability and performance of each horse. Also see PERSONAL SERVICE.

55. Equestrian - (D.O.T. 159.348) - Entertains audience by riding horses at circus, carnival, exhibition, or horse show, performing acrobatic stunts on saddleless horse or feats of equestrian skill and daring. When performing stunts on horse without saddle, may be designated as Bareback Rider.

56. Horseman - (D.O.T. 153. series) - A term applied to any worker who trains and rides horses for entertainment of audience, directing horses in performing stunts on horse. May be known as Show-Horse Driver - (D.O.T. 159.348).

57. Horse-Race Starter - (D.O.T. 153.268) - Determines sequence of entry of horses into starting gate at racetrack and gives directions to jockeys and other track personnel in getting horses into position. Gives

directions to track personnel to assist jockeys in getting mounts into starting gate when horses refuse to enter. Signals jockeys and other track personnel when ready for starting race to insure all horses an even break from gate. Presses starter button that opens gates to release horses. May recommend removal of horse from race when horse appears unfit for racing.

58. Horse-Race Timer - (D.O.T. 153.388) - Clocks and records time required for horse leading in race to run specified distance. Records fractions and total time required to run race, number of horses crossing finish line first, number of race, and date. Compares stopwatch readings with reading of electronic timer and reports significant differences to the Racetrack Steward.

59. Patrol Judge - (D.O.T. 153.268) - Watches running of horse-races at racetrack to detect infractions of racing rules and resolve claims of fouls committed. Observes running of race from elevated stand to detect interference between horses or actions of jockey that cause his mount to lose chance of winning. Discusses race with other judges to determine if race was run in accordance with racing rules.

60. Racetrack Steward - (D.O.T. 153.118) - Coordinates activities of racetrack personnel and negotiates with other racetrack officials and state racing commission to interpret and enforce racing rules and regulations. Approves or disapproves requests for equipment changes on horses by owners and horse trainers. Orders removal of unfit horses from race. Observes entry of horses into starting gate to insure each horse gets fair break from gate. Observes running of race to detect fouls, interference between horses, etc., and to determine official finish. Determines jointly, with other race track officials, violations of racing rules and penalties to be assessed in accordance with state racing commission. Supervises all employees of track engaged in conducting races. Directs claiming of horses.

61. Jockey - (D.O.T. 153.248) - Rides racehorse at racetrack and receives riding instructions from horse trainer before race. Analyzes ability and peculiarities of his and other horses to determine how he should ride.

62. Jockey-Room Custodian - (D.O.T. 346.868) - Insures that jockeys scheduled to ride are present in jockey room at the racetrack and that their dress and riding equipment meet track specifications. Notifies jockeys when to dress and then inspects the dressed jockeys to insure that they have correct colors (silks), saddle numbers, and riding equipment. Informs steward and the racetrack of jockeys not reporting

to prepare for race. Maintains order in jockey room. Examines lead pads to determine that they have met track specifications. Gives directions to workers to clean jockey room.

63. Jockey Valet - (D.O.T. 346.878) - Assists jockey to dress for race at racetrack. Inserts lead bars into saddle so that jockey will fulfill weight requirements. Carries saddle from tack room to paddock. Places saddle, saddle number, and lead pad on horse. Assists jockey to mount horse. Returns tack to jockey room after race. Cleans tack for jockey.

64. Sulkey Driver - (D.O.T. 153.248) - Participates in harness race by riding in horse-drawn, two-wheel sulky, guiding horse with reins and tightening or slackening reins to control speed.

65. Clocker - (D.O.T. 153.368) - Clocks the time of racehorses at racetrack during morning workouts to obtain speed information. Observes horse during workout and assigns speed rating according to distance run, time required as determined by stopwatch, and effort extended by horse and rider. Records information and submits it to track management.

66. Horse Exerciser - (D.O.T. 153.874) - Rides racehorse to exercise and condition it for racing according to specific instructions from horse trainer. Informs horse trainer of peculiarities of horse observed while riding, such as dislike of whip or shyness at track rail, so that changes can be made in riding equipment.

67. Skating Rink Iceman - (D.O.T. 969.887) - Prepares floor for use as ice-skating and removes ice after use. Sprays floor of rink, which has been chilled by ammonia pipes, with water hose to obtain ice layer of specified thickness. May preserve order among patrons and protects property during skating sessions.

68. Play Leader - Exercises general supervision over the play of children or adults on a playground or in a community center, leads groups in organized play activities, or assists with special projects.

69. Specialists and Assistants - Serve as instructors in a special activity, usually at more than one center, or on a part-time basis. Generally restricted to organizing and teaching groups in a particular activity such as golf, tennis, swimming, etc. Differs from the supervisor of special activities in that usually they do not have responsibility for promoting or supervising a phase of the program on a city-wide basis.

70. Supervisor of Special Activities - Specialists in charge of special

phases of program development, such as Supervisor of Athletics, Supervisor of Drama.

71. Recreation Superintendent - Chief executive officer in charge of a department or division and its personnel; usually responsible to a board or commission; sometimes directly responsible to a city manager, city council, or city commissioner. May be responsible to the Superintendent of the department if the community recreation work is administered as a division of some other department.

72. General Recreational Supervisor - Responsible to the superintendent and is in charge of a group of recreation centers of similar kind, their personnel and the general program of activities carried on therein; may be in charge of some special function such as construction and maintenance generally applicable to all centers.

73. Director of Recreation Centers - In charge of administering the facilities, staff, and program of a recreation center such as a playground, community center, swimming pool, golf course, or camp. May be referred to as Manager at golf course, swimming pool, or bathing beach.

74. Camp Counselor - (D.O.T. 159.228) - Directs recreational and avocational activities of children or adults at vacation or work camp. Organizes and leads groups in sports, nature lore, and similar outdoor recreational activities. Instructs learners and coaches group members to improve their proficiency in sports and other activities. Safeguards health of campers. Maintains discipline and otherwise guides conduct of juvenile campers. May be designated according to type of camp activity, such as Dramatics Counselor, Swimming Counselor, etc.

75. Attendant at Golf Course, Tennis Court, Skating Rink, and Related Facilities - (D.O.T. 341. series) - Includes occupations concerned with starting players on golf courses, assigning tennis courts, keeping records of players receiving fees, giving skating instruction, and caddying for golfers. Includes caddies and workers who issue athletic equipment or skates, etc. May be designated as Caddie Master - (D.O.T. 341.138), Recreation-Facility Attendant - (D.O.T. 341.368), Ski-Tow Operator - (D.O.T. 341.865), Caddie - (D.O.T. 341.878), Golf Range Attendant - (D.O.T. 341.887).

76. Amusement Device and Concession Attendant - (D.O.T. 342. series) - Includes occupations concerned with operating games of chance or skill or other types of amusement equipment, such as the ferris wheel, roller coaster, merry-go-round; and running fairs, carnivals, circuses, or amusement parks. Includes spielers or barkers

who solicit patronage. May be designated as Barker, Doorman, Footman, Ballyhoo Man, Carney, Contact Man, Pitchman, Spieler - (D.O.T. 342.858), Concession Attendant, Shill, Shooting-Gallery Operator, Weight Guesser, Ride Operator - (D.O.T. 342.863), Fun-House Operator - (D.O.T. 342.865), Boat-Dock Operator - (D.O.T. 342.867), Wharf Attendant (See TRANSPORTATION), Boat-Tank Man, Cabana Boy - (D.O.T. 342.877), Ride Attendant - (D.O.T. 342.878).

77. Amusement and Recreation Service Occupations - (D.O.T. 349. series) - Includes occupations concerned with amusement and recreation services. May be designated Pony-Ride Operator - (D.O.T. 349.228), Receiving-Barn Custodian, Score-Board Operator - (D.O.T. 349.685), Ticket-Dispenser Man - (D.O.T. 349.780), Hostess - (D.O.T. 349.868), Bat Boy - (D.O.T. 349.878), Children's Matron, Drive-In Theatre Attendant.

78. Bowling Floor Deskman - (D.O.T. 340.368) - Assigns bowling alleys to patrons and collects fees. Also reserves alleys for bowling league or individual(s). Issues score sheets and alley numbers to patrons. Observes players to determine misuse of alleys or other equipment. Records number of games played and receipts collected. Rents bowling shoes to patrons.

79. Racker - (D.O.T. 340.878) - Positions pool balls on table, using a triangular rack. Performs such services as supplying chalk to players, cleaning table with brush, and placing cues in cue rack after game. Computes and collects fees from players or writes fees on slips for collection by manager or cashier. May inspect cue tips and replace them, using glue and knife.

80. Kennel Master - (D.O.T. 349.368) - Performs the following tasks at dog-racing track before each race: verifies credentials of each dog entered in race, comparing color, name, and sex of dog and name of owner with information on racing form. Insures that dogs are admitted to assigned stalls, notifying other workers to round up appropriate dogs in advance of each race. Guards dogs to prevent unauthorized persons from injuring them or attempting illegally to influence their performance. Notifies owner or veterinary personnel in cases of injury or suspected illness. Cleans racing stalls after each race. Notifies track officials of irregularities, as required by racing regulations. See PERSONAL SERVICE.

81. Public Address Announcer - (D.O.T. 159.148) - Announces information of interest to patrons of sporting events, using public-address system. May make running comment on event, presenting play-by-play description and inserting biographical notes on players to keep

spectators informed and entertained. May furnish information concerning plays to Score-Board Operator, usually by telephone.

82. Public Relations Man (Advance Man) - (D.O.T. 191.168) - Coordinates business details concerned with production of entertainment in advance of theatrical troupe, lecturer, circus, road show, motion picture, or other entertainment. Inspects performance location and reports its condition, and if stage presentation, inspects equipment and accommodations of theater, such as size of stage, seating capacity, and number of dressing rooms. Completes business arrangements, such as advance sale of tickets and procurement of legal permits. May distribute advertising and publicity matter.

83. Booking Agent - (D.O.T. 191.118) - Books theatrical troupes, performers, motion pictures, or other popular attractions for entertainment in establishment he represents, such as night club, theatre, or dance hall. Negotiates with representatives of attractions to arrange terms of contract and fees to be paid for engagement. Auditions new talent. Purchases advertising space, promotes newspaper publicity, and arranges for billing, according to contract agreements.

84. Master of Ceremonies - (D.O.T. 159.148) - Introduces entertainers, speakers, or other celebrities to audience, interspersing introductions with jokes, songs, biographical sketch of speaker, or other specialties to entertain an audience.

85. Gambling Hall Attendant - (D.O.T. 343. series) - Includes occupations concerned with running games of chance in gambling establishments. Involves dealing cards or providing other gambling equipment. May be designated as Cardroom Manager - (D.O.T. 343.138), Cardroom Supervisor, Card Player - (D.O.T. 343.368), Floorman - (D.O.T. 343.468), Twenty-Six Girl (Dice Girl), Cardroom Plastic-Card Grader - (D.O.T. 343.687), Booster - (D.O.T. 343.658), Boardman - (D.O.T. 343.878).

86. Guide - Provides information to individuals or groups about articles in museums, churches, the buildings themselves, historic incidents, etc.

87. Hunting and Fishing Guide - (D.O.T. 452.868) - Plans itinerary for hunting and fishing trips, guides and transports sportsmen to hunting and fishing areas. Plans route that will afford best camping sites and hunting and fishing areas, utilizing knowledge of country-side. Explains hunting and fishing laws and insures that laws are obeyed. Drives motorboat or land vehicle to transport sportsmen to hunting and fishing areas. Gives first aid to members of group in emergency.

May feed, water, and care for animals. May arrange for use of cabins and supplies needed by sportsmen.

88. Huntsman - (D.O.T. 187.168) - Coordinates hunt activities of hunt clubs and workers engaged in care and training of horses and hounds used in fox hunting. Directs subordinates engaged in training animals, in detection of early stages of animal illness, and in repairing and repainting stables and kennels. Assists master of fox-hounds in setting up obstacles on hunt course, in scenting hunt trail when live quarry is not used, and in staging horse shows. Rides with participants of hunt to control hounds and time horses, using stopwatch. Assigns stable facilities to horses of visiting riders.

89. Boat-Dock Operator - (D.O.T. 342.867) - Rents canoes, rowboats, motorboats, and fishing equipment, and sells bait to patrons. Calculates and collects rentals. Repairs boats.

90. Diver - (D.O.T. 349.248) - Feeds, describes, and identifies fish enclosed in aquarium or community fish tank for public amusement. Cleans tank, observes and reports diseased, injured, or dead fish. Gives routine medical treatment. See MARINE SCIENCE.

91. Wharf Attendant - (D.O.T. 342.867) - Launches and moors boats on lake or similar amusement place, and shows patrons how to guide crafts, such as rowboats, canoes, motorboats. Cleans, paints, and varnishes, and makes minor repairs on motors.

E. RECREATION CONCERNED WITH NATURAL RESOURCES - Experience indicates to us that only those things which we earn can be precious; however, we need look only to our inheritance of the wonders of Nature to realize that they also are precious. The pulse of public interest in our inheritance has quickened in the last decade. We find ourselves trying to achieve anew the experiences of beauty that Nature has bestowed upon us. This interest has opened up a relatively new economic venture for many enterprising cities and/or states, companies, and individuals who have begun to provide a means by which man can enjoy his natural resources.

Occupations in this family naturally overlap with those of other families, but they do include those concerned with recreational facilities provided by Nature, i.e., ocean and lake beaches, forests, wild life areas, etc. This family is also comprised of those individuals who work as tour guides, concession attendants, zoo or animal keepers, lifeguards, etc. Providing recreational opportunities to enjoy the beauties and wonders of Nature is truly a unique and fast-growing field.

1. Information Center Personnel - (D.O.T. 237. series) - Answer inquiries of tourists and provide information regarding activities of the area, such as guided tours, etc.
2. Concession Attendant - (D.O.T. 342.858) - Induces customers to purchase food or participate in games at concession booths in parks, carnivals, stadiums, or similar amusement places. Serves customers game equipment or refreshments and collects fees for services. Cleans and repairs booth and keeps equipment in serviceable condition.
3. Lifeguard - (D.O.T. 379.868) - Monitors activities in swimming areas to prevent accidents. Cautions swimmers regarding unsafe areas. Rescues swimmers in danger of drowning and administers first aid. Maintains order in swimming areas. Inspects facilities for cleanliness. May clean and refill swimming pool. May conduct or officiate at swimming meets. May give swimming instructions.
4. Visitor or Tourist Guide - (D.O.T. 353. series) - Escorts visitors around the area, explaining and describing significant events and locations. Answers questions concerning the area.
5. Zoo Keeper and Attendant - (D.O.T. 356.138) - Supervise care and exhibition of animals and birds at zoo. Examine animals to determine need for medical care. May bathe and groom animals. Clean cages and feed and water animals.

**RECREATION
AND
HOSPITALITY
(TOURISM)**

COMMERCIAL AND NON-COMMERCIAL TRAVEL BUREAUS

Travel bureaus, both commercial and non-commercial, are generally limited to providing the public with travel information and attempting to promote goodwill.

Public R
and Pu
Informat
Librarian

TRAVEL AGENCIES

The travel agency not only provides the traveler with information about vacation areas but informs him of tours and accommodations that the agency can arrange for him.

TRANSPORTATION

Transportation, in this instance, refers only to those individuals who are concerned with passenger and/or tourist comfort.

Passenger
Tour Dir
Tour Cor
Sight-see
Public R

**PUBLIC, INDUSTRIAL, AND PRIVATE RECREATION
(COMMERCIAL AND NON-COMMERCIAL)**

Any occupation concerned with athletics or sports, entertainment, amusement, or recreation services is included in this category.

RECREATION CONCERNED WITH NATURAL RESOURCES

This category includes those occupations concerned with recreational facilities provided by Nature, i.e. ocean and lake beaches, forests, wild life areas, etc.

Informati
Guides
Lifeguards
Concessio
Zoo Keep

4. TRAVEL BUREAUS
are generally limited to providing
promote goodwill.

Public Relations and/or Advertising
and Publicity Coordinators
Information Personnel
Librarians

5
information about vacation areas
agency can arrange for him.

Public Relations Personnel
Sales Agents and Agency Representatives
Clerks and Advisors

individuals who are concerned with

Passenger Agents and Clerks
Tour Director
Tour Conductor
Sight-seeing Company Personnel
Public Relations Personnel

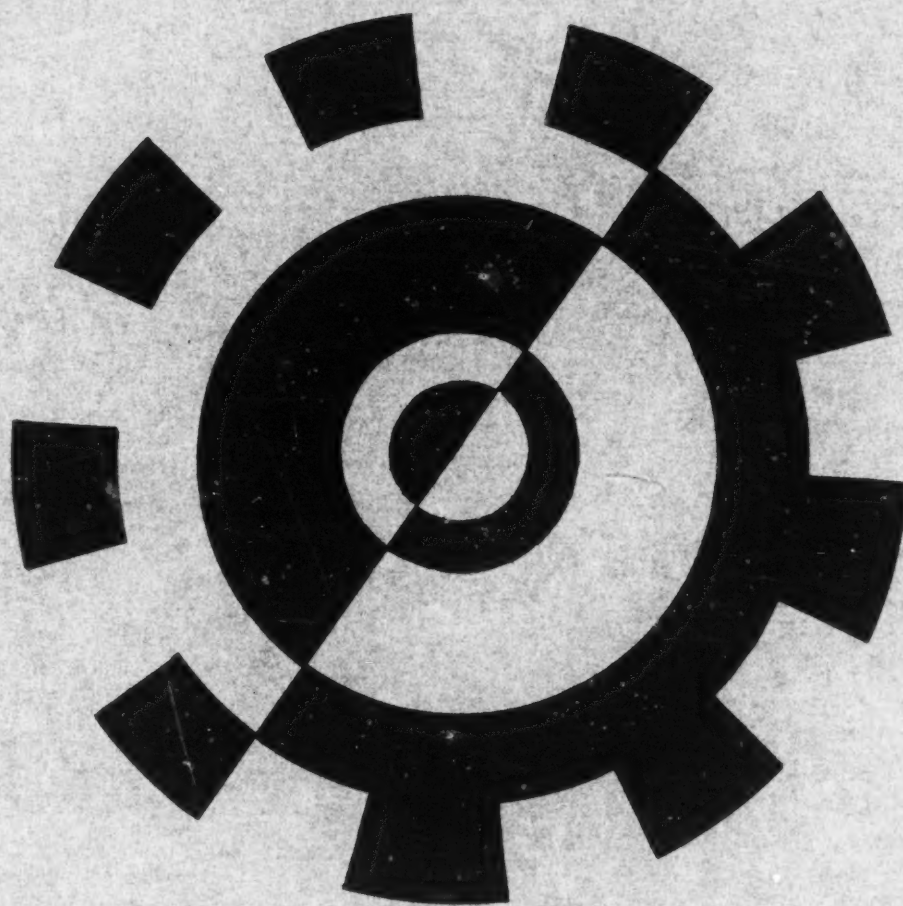
TE RECREATION
(COMMERCIAL)
entertainment, amusement, or

Superintendent
General Supervisors
Supervisors of Special Activities
Director of Centers
Play Leaders
Specialists

NATURAL RESOURCES
with recreational facilities provided
areas, etc.

Information Center Personnel
Guides
Lifeguards
Concession Attendants
Zoo Keepers and Attendants

MANUFACTURING



PREPARED BY
FLOYD SPEARS
GRAYSON COUNTY COLLEGE
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MANUFACTURING

INTRODUCTION

It is probable that the kindergarten child will not show an interest in the job of "skull grinder" in the local slaughter house. But it is important that teachers at all levels be aware that such a job exists and that someone must perform the chore of grinding skulls.

According to the dictionary, the word "manufacture" is derived from a Latin word meaning "make or do." A more modern definition would be the process of making wares or products by hand or by machinery. It might be on a large scale, producing huge quantities, or on a small scale where only a few hundred items are produced. Whatever is manufactured is usually classified as durable or non-durable goods, and may be finished or semi-finished. The manufactured products sometimes cause a person to hesitate for thought. The products range from huge earth-moving equipment, capable of scraping and loading a hundred tons of earth, to the micro-mini parts of an electronic instrument.

MANUFACTURING is an enormously complex occupational cluster. It is almost impossible to list and describe all the jobs that presently exist. Due to technological changes, a job that is important today may not exist tomorrow. In the alphabetical index of the U. S. Government Printing Office's Standard Industrial Classification Manual, there are approximately 1,634 different manufacturing industries listed. In the 1066 supplement to the Dictionary of Occupational Titles, there are more than 8,000 job titles for manufacturing.

Many times an item is assembled from a number of different parts made in widely separated manufacturing plants. In some instances, a small manufacturing concern lumps many separate jobs or positions into one occupation. The plant manager may be in charge of personnel, public relations, production, and customer relations. In the production aspect, welders may do riveting, grinding, finishing, and many other jobs. In this situation one person may perform the work which is described under several of the positions listed in the Dictionary of Occupational Titles. On the other hand, in larger plants, a worker may be assigned to only one job.

It should be pointed out that all unskilled labor is not necessarily undesirable work. An unskilled job may be light, sedentary work, where the heaviest thing lifted would be an optical lens. It should be further pointed out that some highly skilled occupations require a great deal of physical effort and stamina. A good example might be a journeyman carpenter.

In manufacturing there are a number of supporting crafts such as electricians, plumbers, pipefitters, carpenters, and building and ground maintenance people. Many of these occupations will be found listed and described in the CONSTRUCTION pamphlet. These people are not directly involved in making a product, but their skills and expertise are vitally necessary in any manufacturing activity.

A counselor-teacher has a tremendous responsibility when guiding a young person into this world of work, but this guidance can be rewarding. To allow a young person to drift into a job in this occupational cluster without proper preparation and without a working knowledge of what goes on can be disastrous and a waste of human resources. The teacher, then, must be aware of some of the things that are going on in MANUFACTURING: what the jobs are, what they offer in the way of a challenging and fulfilling experience, opportunities for advancement, anticipated length of employment, remuneration expected, inherent hazards, job security, etc. It is equally important that institutions charged with the responsibility of training teachers place all available counseling information into the hands of prospective teachers and see that they know how to use the material.

It is expected that by 1980, well over twenty million people will be employed in manufacturing industries. By far this is the greatest number of people in any area of work.

II. METHODOLOGY

The research involved in this study included several visits with people in the U. S. Government Office of the Department of Commerce, Department of Labor, the Manpower Offices and the Bureau of Apprenticeship and Training, the U. S. Chamber of Commerce, and the Texas Manufacturers' Association. There were also visits to different types of manufacturing concerns textiles, van bodies, metal extrusions, surgical dressings, electronic equipment, garment, and food products. In addition, plant managers, personnel directors, public relations officers, shop superintendents, and others were interviewed.

Many journals, pamphlets, and other publications were read and examined. The following bibliography includes consulted material.

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10. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual Job Families, with a listing and discussion of the function of individual occupations, are listed below:

A. MANAGEMENT - It would be impossible to describe every position and job within the management area of the MANUFACTURING cluster in this pamphlet. Of course Management is the life blood of any manufacturing concern. It is responsible for day-to-day operations of the physical facilities as well as providing plans for future development. The organization will not function properly if this service is impeded in any way. The making or breaking of a manufacturer is usually accomplished in the management field. It is the responsibility of management to see that all processes are orderly and profitable. Those involved are responsible to their own employees, to the consumer, to the public, and to the federal, local, and state governments. They must satisfy the stockholders and see that a proper company image is projected.

1. President - (D. O. T. 189.118) - As head administrator of business organization, develops and administers policies of organization in accordance with corporation charter. Establishes operating objectives and policies for firm. Coordinates plans to insure effective flow of work between divisions. Reviews progress and makes necessary changes in company plans. Directs preparation of major financial programs, such as pricing policies and salary-and-wage-schedules, to insure operating efficiency and adequate investment and dividend returns. Plans and develops policies to maintain satisfactory company relations with employees, stockholders, and public. Evaluates performance of executives to insure compliance with overall objectives of firm. May preside over board of directors.

2. Vice President - (D. O. T. 189.118) - Aids head administrator in administering and formulating organization policies and supervises activities of one or more departments, such as purchasing, sales, manufacturing, engineering, or finance. Participates in formulating company policies and assists in developing long range plans. Coordinates programs in departments as approved by President or board of directors to attain company's goals. Confers with President to discuss analyses of activities, costs, budgets, and forecasts to determine

changes needed for attaining company goals. May be responsible for current information on legislation related to operations and for action to secure favorable legislation. May perform duties of President. May serve as member of management committees.

3. Manager, Industrial Organization - (D. O. T. 189.118) - General Manager, Industrial Organization; Manager, General; Manager, Plant; Superintendent, Industrial Organization. Determines and executes administrative policies through subordinate managers. Coordinates activities of departments, such as production, distribution, engineering, maintenance, personnel, and selling. Plans and directs marketing of product to develop new markets and maintain sales volume and competitive position in industry. Plans and develops personnel program to maintain efficient staffing of organization. Reviews and alters programs in areas, such as purchasing, accounting, cost, research and development, and budget allocations, to insure profitable operation of divisions. Represents organization in industry and manufacturing associations to develop acceptance for organization. Also see BUSINESS AND OFFICE.

4. Manager, Sales - (D. O. T. 163.118) - See MARKETING AND DISTRIBUTION.

5. Purchasing Agent - (D. O. T. 162.158) - See MARKETING AND DISTRIBUTION.

6. Accountant - (D. O. T. 160.188) - See BUSINESS AND OFFICE.

7. Manager, Personnel - (D. O. T. 166.118) - Director, Personnel; Manager, Employee Relations; Personnel Supervisor. Plans and carries out policies relating to all phases of personnel activities. Organizes recruitment, selection, and training procedures, and directs activities of subordinates directly concerned. Confers with company and union officials to establish pension and insurance plans, workman's compensation policies, and similar functions. Establishes social, recreational, and educational activities. Studies personnel records for information, such as educational background, work record, and supervisor's reports, to determine personnel suitable for promotions and transfers. May represent company in negotiating wage agreements with labor representatives. May act as liaison between management and labor within organization.

8. Personnel Clerk - (D. O. T. 205.368) - See BUSINESS AND OFFICE.

9. Clerk, General - (D. O. T. 209.388) - See BUSINESS AND OFFICE.

B. SCIENTIST - Scientists are engaged in scientific studies and research for a manufacturer. The scientist is usually found behind the scenes in a laboratory or office. Much of their work has an abstract quality or deals with theoretical problems. The scientist may work on his own, for a research firm, or be employed in a research division of a manufacturing company. He may be assisted by engineers, technicians or aides. His greatest responsibility is in collecting and analyzing data. His work may be related to environment, life, nature or other material things.

1. Chemist, Analytical - (D. O. T. 022.081) - Conducts research to develop or improve analytical techniques, methodology, and procedures and to investigate application of instruments to analysis. Carries out qualitative and quantitative analyses of organic and inorganic compounds to determine chemical and physical composition and properties, utilizing techniques, such as chromatography, spectroscopy, and spectrophotometry. Identifies elements and unknown compounds by observing and recording characteristic spectra through use of spectrograph and other methods. Ascertains relationships between molecular structure and chemical and physical properties to aid in analysis of unknown compounds. Establishes, develops, and improves procedures for quality control tests and analyses.

2. Chemist, Organic - (D. O. T. 022.081) - Conducts experiments on substances of which essential element is carbon to develop and improve materials and products and discover scientific facts; Combines organic compounds to make new substances or to duplicate substances found in nature. Carries out and participates in experiments designed to develop and improve, by chemical means, color, texture, and strength, and lasting qualities of paint, rubber, wood, dye, petroleum and other organic compounds and byproducts. Develops new uses for chemical byproducts, and devises new procedures for preparing organic compounds. May specialize in creation and development of new organic compounds and synthetic methods and be designated Chemist, Organic Synthesis. May specialize in particular material or product and be designated as Chemist, Coating; Chemist, Detergents; Chemist, Organo-Metallics; Chemist, Plastics and Resins; Chemist, Polymers.

3. Physicist - (D.O.T. 023.081) - Conducts research into phases of physical phenomena, develops theories and laws on basis of observation and experiments, and devises methods to apply laws and theories of physics to industry, medicine, and other fields: Performs experiments with masers, lasers, cyclotrons, betatrons, telescopes, mass spectrometers, electron microscopes, and other equipment to observe structure and properties of matter, transformation and propagation of energy, relationships between matter and energy, and other physical phenomena. Describes and expresses observations and conclusions in mathematical terms. Devises procedures for physical testing of materials. Conducts instrumental analyses to determine physical properties of materials. May apply methodology of physics to a particular physical property or phenomenon. May engage in teaching.

C. ENGINEERS - Engineers in Manufacturing are people who implement the ideas of scientists. They are concerned with the physical, the real, and the material aspects of manufacturing. Engineers may specialize in one particular area, or they may have more generalized qualifications. They work in the areas of design, planning, production, testing, inspection, or sales and service. They may be involved with chemicals, minerals, plastics, or mechanics. Because of the high degree of specialization, an engineer must have formal credentials. Working conditions for engineering people are usually very desirable. An engineer will often direct the work of several draftsmen, technicians, and other specialists. At other times, they may work entirely alone.

1. Electrical Engineer, Power - (D.O.T. 003.087) - Plans construction and coordinates operation of power stations transmission lines, and distribution systems: Plans layout of generating plants and distribution lines, prepares drawings, and specifies type of equipment and materials to be used. Estimates labor, material, and construction costs. Plans equipment installation and inspects completed work for efficient operation and compliance with specifications and safety standards. Computes power rates and assists others in evaluating properties and developing utility systems in new territories. May perform supervisory duties.

2. Industrial Engineer - (D.O.T. 021.081, .168 and .188) - Performs a variety of engineering work in planning and overseeing utilization of production facilities and personnel in department or other subdivision of industrial establishment. Plans equipment layout, workflow, and accident

prevention measures to maintain efficient and safe utilization of plant facilities. Plans and oversees work study and training programs to promote efficient manpower utilization. Develops and oversees quality control, cost control, inventory control, and production record systems.

3. Engineering Liaison Man - (D. O. T. 012.188) - Investigates fabrication and assembly difficulties involving engineering problems. Interprets specification changes for department heads and shop workers. Mathematically checks engineering drawings and project sketches of parts and assemblies to determine practicability of changes in specifications, and recommends corrective procedures. Compares rejected parts and assemblies with engineering drawings and specifications to determine whether deviations are due to errors in specifications, fabrication, or assembly. Verifies optimum utilization of machine tools and equipment, and initiates or recommends changes in equipment usage or work methods to improve efficiency and product quality.
4. Mechanical Engineer - (D. O. T. 007.081, .151, .168, .181, and .187; 011.081; and 019.187) - Performs a variety of engineering work in planning and design of tools, engines, machines, and other mechanically functioning equipment, and oversees installation, operation, maintenance, and repair of such equipment, including centralized heat, gas, water, and steam systems.
5. Engineering Scheduler - (Engineering Planner) - (D. O. T. 002.188) - Schedules and expedites preparation of engineering drawings of airplane and missile parts. Consults records to ascertain drawings to be made and workers to whom work has been assigned. Estimates number of hours required to complete each drawing by consulting previous records. Consults with supervisory personnel to ascertain when specific drawings are needed. Assigns starting and completion dates for drawings and personnel to prepare charts, showing schedules of drawings, progress of work, deviations from schedules, and assignment of personnel. Keeps records and prepares reports to be used as guides in future planning.
6. Aerospace Engineers - (D. O. T. 002.081) - Play a vital role in America's space activities. Engineers in this branch of the profession work on all types of aircraft and spacecraft including missiles, rockets, and conventional propeller-driven and jet-powered planes. They are concerned with all

phases of the development of aerospace products from the initial planning and design to the final assembly, and testing.

7. Ceramic Engineers - (D. O. T. 006.081) - Concerned with one of the world's oldest and yet newest technologies. They develop methods for processing clay, silicates, and other nonmetallic minerals into a wide variety of ceramic products, ranging from glassware, cement, and bricks, to coatings and refractories for missile nose cones. They may also design and supervise the construction of the plant and equipment used to manufacture these products.
8. Chemical Engineers - (D. O. T. 008.081) - Design plants and equipment to manufacture chemicals and chemical products. They also determine the most efficient manufacturing process, which requires a knowledge of chemistry, physics, and mechanical and electrical engineering. They often design and operate pilot plants to test their work.
9. Metallurgical Engineers - (D. O. T. 011.081) - Develop methods of processing and converting metals into useful products. These engineers usually work in one of two main branches of metallurgy---extractive or physical. Extractive metallurgy involves the extraction of metals from ores and their refining to obtain pure metal. Physical metallurgy deals with the properties of metals and their alloys, and with methods of converting refined metals into useful final products.
10. Mining Engineers - (D. O. T. 010.081 and .187) - Find and extract minerals from the earth and prepare minerals for use by manufacturing industries. They design the layouts of mines, supervise the construction of mine shafts and tunnels in underground operations, and devise methods of transporting extracted minerals to processing plants. They are responsible for the efficient operation of mines and mine safety, including ventilation, water supply, power, communications, and maintenance of equipment. They may work with Geologists and Metallurgical Engineers.
11. Civil Engineer - (D. O. T. 005.081) - See PUBLIC SERVICE.
12. Illuminating Engineer - (D. O. T. 003.081) - See CONSTRUCTION.
13. Architectural Engineer - (D. O. T. 001.081) - See FINE ARTS AND HUMANITIES.

14. Engineering and Science Technicians - (D. O. T. 002. through 029. series) - Work in direct support of Engineers or Scientists, utilizing theoretical knowledge of fundamental scientific, engineering, mathematical, or draft design principles.

15. Draftsmen - (D. O. T. 001. through 019. series) - Translate the ideas, rough sketches, specifications, and calculations of engineers, architects, and designers into working plans which are used in making a product. Draftsmen may calculate the strength, reliability, and cost of materials. See also CONSTRUCTION.

D. TECHNICIAN - The technician is an indispensable person in manufacturing. Technological development, sophisticated machinery, exotic materials, and electronic control devices have increased the need for technicians in MANUFACTURING. The technician may work with a scientist or an engineer, he may be charged with production planning, or with quality control. His work may be in the fields of metal, fabrics, chemicals, or mechanical and/or electrical equipment. Decision making, supervision, communication, planning and execution are often within the responsibilities of technician. He is usually required to have a college education. Also he is quite often required to demonstrate practical motor skills in his particular work area. The pay, fringe benefits, and working conditions are generally good.

1. Electronics Technician, Automated Process - (D. O. T. 726, 281) - Tests and repairs electronic components of automated production lines that produce deposited carbon resistors for use in electronic equipment, such as missile control systems. Starts electronic units that control production machines and observes monitoring graphs and gages to verify operation of machines along automated line. Types program onto punch tape following coded production order. Inserts punch tape into reader that types data on data sheet and transmits data to magnetic memory drum of digital computer. Compares typed data sheet with coded production order to verify information transferred to memory drum. Starts computer's output and input circuits to set up production machines according to program and close loop to effect feedback of data. Starts conveyors and machines and observes feedback data sheet, monitoring graphs, and gages to detect malfunctions in automated processing machinery and electronic equipment. Tests electronic circuits and analyzes data to isolate malfunctions, using oscilloscope, synchroscope, oscillators, galvanometer, voltmeter, and calibration charts, following

schematic and wire diagrams. Repairs equipment by rewiring components, soldering loose connections, and replacing parts, such as coils, condensers, tubes, and resistors, using such handtools as pliers, screwdrivers, tweezers, wirecutters, soldering iron, and knife. Adjusts circuit variables and calibrates and aligns control components according to calibration charts and graphs.

2. Mathematical Technician - (D. O. T. 020.188) - Data-Reduction Technician; Engineering Analyst; Technical Analyst. Applies standardized mathematical formulas, principles, and methodology to technological problems in engineering and physical science in relation to specific industrial and research objectives, processes, equipment, and products. Confers with professional, scientific, and engineering personnel to determine objective, condition, and delineation of problems, such as determining functional feasibility of design proposals for electronic computer circuitry, analyzing effects of structural stress and deflection on missile performance, or establishing correlations between temperatures and other variables. Selects most practical and accurate combination and sequence of computational methods, including algebra, trigonometry, geometry, vector analysis, and occasionally calculus to reduce raw data to meaningful and manageable terms consistent with reliable combination of manual, mechanical, and electronic data processing.

3. Metallurgist, Assistant - (D. O. T. 011.281) - Metallurgical Laboratory Assistant; Metallurgical Tester; Physical Laboratory Assistant. Examines and tests metal samples to determine their physical properties, under direction of Metallurgist, Physical: Conducts routine microscopic examinations of metals and alloys to determine their crystal-line structure, porosity, homogeneity and other characteristics. Prepares photographs of metal specimens, using photomicroscope, studies and interprets photographs, and compiles reports of findings. Examines metal and alloy samples with X-ray, and magnetic-flux equipment to detect internal fractures, impurities, and similar defects in metals. Tests samples in pressure devices, hot-acid baths, and other apparatus to determine strength, hardness, elasticity, toughness, or other properties of metal.

4. Quality Technician - (D. O. T. 579.384) - Laboratory technician. Tests fiber glass yarn, fibers, or binder solutions at any stage in manufacturing process to determine if standards are met. Weighs samples of fiber and binder solution

on balance scales before and after drying in miniature oven and burning in muffle furnace, and computes percentage of binder on fiber and percentage of solids in binder solution, using slide rule or mathematical formula. Examines and tests goods returned by customer or at customer's establishment to detect manufacturing defects or damage incurred in transit and records results for use by quality control and production supervisors.

E. CRAFTSMEN - The craftsman is a key man in any manufacturing industry. He is the personal link between the worker and the management. The craftsman differs from skilled workers in that he has excelled in his particular trade and also possesses leadership ability and planning expertise. He is well paid, and as a rule, works under good conditions.

1. Electrician Foreman - (D. O. T. 829.131) - Electrician Supervisor; Foreman, Electrician. Supervises and coordinates activities of Electrical Repairman and Electricians engaged in construction, maintenance, and repair of electric power, lighting, and communications systems of buildings, factories, and transportation equipment. Plans wiring and installation of equipment and fixtures, such as motors, generators, switches, and fuse boxes, according to blueprints, schematic drawings, and sketches. Inspects wiring and fixtures for conformity to company specifications or municipal codes, using test equipment, such as voltmeter and ohmmeter. Performs other duties as prescribed under Foreman. May supervise only those workers engaged in maintenance of electrical systems and be designated Building Maintenance Supervisor.

2. Master Mechanic, Maintenance - (D. O. T. 638.131) - Craft Foreman; Maintenance Supervisor. Supervises and coordinates activity of workers engaged in setting up, installing, repairing, and maintaining process equipment and machinery and in fabricating metal parts and tools. Directs workers engaged in repairing and maintaining mechanical parts of equipment and machines. (Maintenance Mechanic Foreman). Directs workers engaged in dismantling, assembling, and installing industrial machinery (Millwright Foreman). May requisition and keep supply of spare parts. Performs other duties as described under Foreman.

3. Master Tailor - (D. O. T. 785.261) - Custom Tailor; Journeyman Tailor; Made-to-Measure Tailor; Tailor. Designs and makes tailored garments, such as suits, topcoats, overcoats, and other dress clothing, applying principles of garment design,

construction, and styling. Confers with customer to determine type of material and garment style desired. Measures customer for size and records measurements for use in preparing patterns and making garments. Develops designs for garments or copies existing designs. Draws individual pattern for garment or alters standard pattern to fit customer's measurements. Outlines patterns of garment parts on fabric and cuts fabric along outlines using shears. Assembles garments, sewing padding to coat fronts, lapels, and collars to give them shape and joining garment parts with basting stitches, using needle and thread or sewing machine. Sews buttons and buttonholes to finish garment. Also see PERSONAL SERVICES.

4. Tool Designer - (D. O. T. 007.081) - Development Mechanic; General and Special Tools Investigator and Planner; Machine Tool and Die Technician; Tool and Equipment Design Specialist. Designs broaches, milling machine cutters, drills, and other single- or multiple-edged cutting tools, and related jigs, dies, and fixtures for production or experimental use in metal working machines. Applies algebraic and geometric formulas and standard tool engineering data to develop tool configuration. Selects standard items such as bushings and tool bits for incorporation into tool design. Draws preliminary sketches and prepares layout and detailed drawings. Modifies tool designs according to trial or production service data to improve tool life or performance.
5. Die Maker - (D. O. T. 601.280) - Lays out, machines, fits, assembles and finishes castings and parts. Makes and repairs stamping dies, analyzing specifications and applying knowledge of die design and construction. May operate power press, perform final shaping and smoothing operations on die in-press.
6. Tool Maker - (D. O. T. 601.280) - Analyzes a variety of specifications; lays out metal stock. Sets up and operates machine tools. Fits and assembles parts to make or repair cutting tools, jigs, fixtures, gages, or machines using hand tools. Applies knowledge of tool design, shop mathematics, metal properties, and layout machining and assembly procedures.
7. Tool and Die Foreman - (D. O. T. 601.130) - Supervises and coordinates activities of workers engaged in production and repair of metal working dies, jigs, fixtures, gages, and cutting tools applying knowledge of machinery, and tool and die construction.
8. Foreman, Artificial Limb Fabrication - (D. O. T. 712.130);-

Supervises and coordinates activities of workers engaged in fabrication and assembly of artificial limbs. Analyzes patterns and the blueprints and sets up machinery, such as duplicators, wood or metal lathes, sanding equipment, and paint or plastic blenders and applicators.

9. Master Mechanic - (D. O. T. 638.131) - See CONSTRUCTION.
10. Carpenter Foreman - (D. O. T. 860.131) - See CONSTRUCTION.
11. Plumber Foreman - (D. O. T. 862.131) - See CONSTRUCTION.
12. Masonry Foreman - (D. O. T. 861.131) - See CONSTRUCTION.
13. Sheet Metal Foreman - (D. O. T. 519.131) - See CONSTRUCTION.
14. Electrical Foreman - (D. O. T. 829.131) - See CONSTRUCTION.

F. SKILLED WORKERS - Some ten million workers in the United States are classified as skilled workers. More than four million are employed in manufacturing. This category includes mechanics, machinists, carpenters, welders, pipe fitters, and others.

Skilled workers make, assemble, and operate complex mechanical devices in industry, transportation, and communications. They also maintain these devices. Most of the crafts require a high degree of manipulative and operative skills. Skilled jobs may require decision-making ability, good vision, good mechanical perception, physical coordination, and reasonable strength. Although it does require a higher degree of discipline than some other areas of work, the pay is better and the satisfaction is better.

Because of their skill and ability, these people are usually in high demand. Generally, skilled people are the last to be laid off as jobs become scarce and the first to be recalled when there is an increase in employment. Working conditions for the skilled worker would almost parallel those of the semi-skilled worker. Job security is better and the worker's opportunity for advancement are better in this job family than in those which follow.

1. Lithographer - (D. O. T. 971.281) - Sketches designs and numbers on metal, stone, or glass with or without specifications,

and engraves plates for printing scale parts, using lithographic, photo-engraving, and photo-lithographic techniques. Draws design on plate, using acid-resistant greasy ink, ruling pens, graduating machines, brushes, and lithographic tools, including engraving needles and beam compress, or transfers designs to plates.

2. Machinist - (D.O.T. 600.280) - Includes Machinist, All-Around; Machinist, First Class; Machinist, General; Journeyman Machinist, Precision. Sets up and operates machines to work metals from crude stock into precision parts used in many industries. May develop specifications for general description and draw and sketch products to be made. May be required to have experience with particular products, machines, or function as construction or repair, and be designated accordingly. Differs from Tool Maker primarily in wider range of products made.
3. Pattern Maker, Plastics - (D.O.T. 754.381) - Jig and Form Maker; Plug Maker. Fabricates patterns, fixtures, jigs, and templates used in producing plastic articles, from wood or metal stock following blueprints and using hand tools, power tools, and measuring instruments. Lays out cutting lines on stock, using scribe, compass, rule, triangles, and French curves. Cuts stock, using power saw, power shear, and hand tools. Assembles pieces using rivets, bolts, nails, or glue. Smooths surface of assembly, using plane and power sander. Verifies dimensions of assembly with calipers, rule, and compass. Sprays coat of parting agent, such as sealing lacquer or wax on surface of assembly.
4. Milling Machine Set-Up Man - (D.O.T. 605.380) - Sets up milling machines for milling machine operators involved in production, and operates machines to mill first-run work pieces.
5. General Assembler - (D.O.T. 726.381) - Arranges layout of work on assembly line following written specifications and oral instructions to facilitate electronic component production.
6. Layout Man - (D.O.T. 600.381) - Lays out metal stock or work pieces such as castings, plates, or machine parts to indicate location and dimensions of processing to be done such as machining, welding, or assembly, analyzing specifications and computing dimensions according to knowledge of product, subsequent processing, shop mathematic, and layout procedures. Studies blueprint, sketch, model, or other plans layout.

7. Gear-Cutting Machine Setup Operator, Tool - (D. O. T. 602.280) - Sets up and operates a variety of gear-cutting machines such as gear shapers, hobbers, and generators to machine splines, rack or gear teeth on metal blank analyzing specifications according to knowledge of gear design, shop mathematics and gear machining processes.
8. Buffing Line Setup Man - (D. O. T. 603.280) - Sets up buffing line to buff metal parts such as automobile trim or hardware to specified finish using knowledge of metal, abrasives, and finishing techniques.
9. Shear Setup Man - (D. O. T. 615.380) - Sets up power shear to cut metal sheet, plate, or bar stock according to work card specifications.
10. Press Operator, Heavy Duty - (D. O. T. 617.280) - Sets up and operates heavy duty power press to bend, form, and straighten metal plates, structural shapes, forgings and weldments as specified by blueprints, layouts and templates. Plans sequence of operations applying knowledge of metal.
11. Calibrator, Resistor - (D. O. T. 726.384) - Calibrates resistors used in test equipment.
12. Calibration Checker I - (D. O. T. 710.387) - Tests temperature-activated controls for specified calibration. Computes difference in degrees between opening and closing temperature and records data.
13. Calibration Checker II - (D. O. T. 710.687) - Tests accuracy of pressure activated controls. Compares reading of scale pointer on controls with readings on pressure gages to verify accuracy of control.
14. Electric Motor Analyst - (D. O. T. 721.281) - Determines causes of failure in electric motors; uses hand tools and test meters.
15. Camera Repairman - (D. O. T. 714.281) - Repairs and adjusts cameras using specialized tools and test devices. Disassembles camera, using hand tools. Tests, adjusts, calibrates using electronic or stroboscopic timing instrument.
16. Instrument Maker - (D. O. T. 719.381) - Installs optical elements, such as lenses, prisms, and mirrors in mechanical portions of such instruments as telescopes, cameras, and

gunsights. Scrapes, files, and laps mount of instrument to align optical elements.

17. Radio Repairman - (D. O. T. 720.281) - Repairs radio receivers, phonographs, recorders, and other electronic-audio equipment, using circuit diagrams and test meters. Tests wiring, tubes, resistors, and other parts, using electronic test equipment, such as voltmeters and oscilloscopes, to locate defects.
18. Hearing-Aid Repairman - (D. O. T. 719.281) - Tests and repairs hearing aids, using oscilloscope, electrical test meters, and handtools, and following schematic diagram. Tests circuits; solders loose connections; repairs or replaces transformer, microphone, and volume control.
19. Fruit Coordinator - (D. O. T. 529.281) - Coordinates flow of materials through departments of citrus fruit processing plant.
20. Pulp and Paper Tester - (D. O. T. 539.384) - Tests samples of each batch of pulp and run of paper.
21. Tinter - (D. O. T. 550.381) - Mixes pigments with paints, enamels or lacquers to match standard of sample colors.
22. Quality Control Tester - (D. O. T. 559.587) - Tests hosiery to verify conformance to plant quality standards or to obtain data for use in establishing standards for new styles.
23. Carpenter - (D. O. T. 860.281) - See CONSTRUCTION.
24. Painter - (D. O. T. 840.781) - See CONSTRUCTION.
25. Welder - (D. O. T. 812.884) - See CONSTRUCTION.
26. Mechanic - (D. O. T. 621.781) - See CONSTRUCTION.
27. Electrician - (D. O. T. 824.281) - See CONSTRUCTION.
28. Plumber - (D. O. T. 862.381) - See CONSTRUCTION.
29. Butcher - (D. O. T. 525.381) - See AGRI-BUSINESS AND NATURAL RESOURCES.
30. Sheet Metal Worker - (D. O. T. 804.281) - See CONSTRUCTION.

SEMI-SKILLED WORKERS - According to the Occupational Outlook Handbook, one out of every six workers is designated as semi-skilled. There are almost fourteen million unskilled positions in the United States, approximately nine million of them in manufacturing. A great portion of the semi-skilled jobs are operative type of work. Many of the semi-skilled people are assemblers, inspectors, helpers, or assistants to skilled workers. A smaller group are apprentices.

Many of the semi-skilled jobs pay quite well and often working conditions are very pleasant. Some semi-skilled jobs require decision making and a degree of ability in dealing with materials. Some of the disadvantages in this family are noise pollution, air pollution, and in some instances, physical vibration. Some of the jobs become monotonous. The possibilities for moving into the skilled areas are very good for people in these occupations.

The jobs listed in this section have been sub-divided into three categories based on the nature of the production involved. These are Mineral, Animal and Vegetable, and Chemical and Synthetic. The listing is a representative sampling of the multitude of semi-skilled occupations found in MANUFACTURING. Wherever possible, the jobs listed are those which can be related to other operations; for instance, a blender of gasoline would perform basically the same functions as a blender of any other liquid. A person involved in the milling of rice would perform, in general, the same operation of an individual milling any other grain.

1. Mineral

- a. Hammer Mill Operator - (D. O. T. 515.887) - Prepares iron and steel machine tool cuttings for use in making ferro-silicon by selecting scraps of desired thickness and breaking them up in hammer mill.
- b. Alodize Machine Operator - (D. O. T. 505.782) - Sets up and operates machine that coats flat sheets or coiled metal to specified color and finish.
- c. Electrostatic Separator Operator - (D. O. T. 509.885) - Tends machine that separates steel particles from abrasive particles.
- d. Kiln Operator - (D. O. T. 509.885) - Tends battery of rotary kilns that heat minerals such as lime, chrome

ore and manganese preparatory to mixing them with molten metal to form steel.

e. Mixer, Iron and Steel - (D. O. T. 510.885) - Tends mixing machines that blend batches of powdered metal according to specifications.

f. Clarifier Operator - (D. O. T. 511.782) - Controls equipment that separates mud from alumina liquor and removes soda from mud.

g. Pyrometer Man - (D. O. T. 512.687) - Tests temperature of molten metal for conformance to pouring specifications using optical or thermocouple pyrometer.

h. Bessemer Converter Blower - (D. O. T. 512.782) - Operates Bessemer converter from control board to oxidize elements such as carbon, manganese, and silicone from molten pig iron. Directs workers to charge converter with molten pig iron. May also be known as Bessemer Converter Man; Converter Man; Steel Converter.

i. Oxygen Furnace Operator - (D. O. T. 512.782) - Operates oxygen furnace and auxiliary equipment from pulpit to produce specified types of steel.

j. Charging Machine Operator - (D. O. T. 512.883) - Controls charging machines to charge open-hearth furnaces with materials such as limestone, pig iron, and metal scraps. Also known as Charger, Furnace; Furnace Charging Machine Operator; Poker-In; Pusher Runner.

k. Cupola Charger - (D. O. T. 512.886) - Charges scrap iron or pig iron, coke and limestone (flux) into cupola in which the iron is melted so that it may be poured into sand molds to make castings.

l. Die Casting Machine Set-Up Man - (D. O. T. 514.380) - Sets up die casting machines that cast parts used such as automobile trim, carburetor housings, and motor parts from non-ferrous metals such as zinc, aluminum, or magnesium.

m. Casting Operator - (D. O. T. 514.782) - Controls pouring stations in which aluminum and aluminum alloys are cast into ingots.

- n. Grinding Mill Operator - (D. O. T. 515.782) - Operates panel board to control machinery and equipment such as conveyor belts, vibrating feeders, distributors, and pumps to grind ore and to separate iron particles from gangue.
- o. Batch Maker - (D. O. T. 515.885) - Tends equipment that mills and recovers powdered metal used in powder metallurgy.
- p. Briquetting Machine Operator - (D. O. T. 519.885) - Tends equipment to dry, mix, and compress copper fines into briquettes for use by smelter.
- g. Arbor Press Operator - (D. O. T. 616.782) - Sets up and operates arbor press to press-fit parts, such as bearings, linings, armatures, or wheels to housings and shafts.
- r. Mirror-Finishing Machine Operator - (D. O. T. 603.782) - Sets up and operates semi-automatic machine to buff silver or stainless steel flatware between cloth or felt rolls to impart mirror-like finish.
- s. Screw Machine Operator - (D. O. T. 604.782) - Operates one or more previously set up multiple - spindle screw machines equipped with automatic indexing and feeding mechanism to perform a series of machining operations on metal bar stock on custom basis following specifications.
- t. Fox-Lathe Operator - (D. O. T. 604.782) - Operates special (fox) lathe to turn cast clock cases and circular clock parts.
- u. Boring Machine Operator - (D. O. T. 606.782) - Sets up and operates one or more boring machines to bore, drill, mill, or ream metal parts according to specifications and knowledge of boring procedures.
- v. Cut-Off Saw Operator, Metal - (D. O. T. 607.782) - Sets up and operates metal sawing machines, such as hacksaw or bandsaw, to cut metal stock to dimensions.
- w. Drop-Hammer Operator - (D. O. T. 610.782) - Sets up and operates closed-die drop-hammer to forge

metal parts, following work order specifications and using measuring instruments and handtools.

x. Die-Setter - (D. O. T. 612.380) - Sets up forging machines, such as forging presses and upsetters, following work order and using handtools and measuring instruments.

y. Coiler Operator - (D. O. T. 613.782) - Operates equipment to wind steel strip into coils as strip emerges from rolling mill.

z. Table Operator - (D. O. T. 613.782) - Operates traveling and stationary tables to feed steel blooms, billets, and slabs to rolls for successive passes through roll stands.

aa. Draw-Bench Operator - (D. O. T. 614.782) - Operates machine to form flat metal strips into tubular, channel, angular, or other shapes.

bb. Hoop-Flaring and Coiling Machine Operator - (D. O. T. 619.782) - Operates hoop-flaring and coiling machine to coil and flare strips of hoop steel to fit barrel. Feeds end of strip of metal into rollers of machine that coil and flare strip. May also be known as Coiler or Flarer.

cc. Rifter - (D. O. T. 571.884) - Splits rough blocks of mica into sheets preparatory to further processing.

dd. Set-Up Man, Molding and Core-Making - (D. O. T. 518.780) - Sets up molding and core-making machine such as roll-over, squeeze, core-making, and shell molding equipment.

ee. Core-Maker, Pipe - (D. O. T. 518.884) - Makes clay cones around which ferrous and non-ferrous pipe is cast.

ff. Stone Grader - (D. O. T. 670.384) - Inspects quarried stone for size and quality and classifies material according to standard schedules.

gg. Plater, Electroplater - (D. O. T. 500.380) - Sets up and controls plating equipment to coat metal objects electrically with chromium, copper, cadmium, or other

metals to provide protective or decorative surface or to build up worn surface. Related jobs are Plater, Brass; Bronze; Cadmium; Chromium; and Copper.

hh. Cylinder Grinder - (D. O. T. 500.781) - Electro-plates rotogravure printing plates with coating of copper and polishes plates to specifications, using grinding machines.

ii. Etcher, Electrolytic - (D. O. T. 500.886) - Tends equipment that electrolytically etches markings, such as trade marks and part numbers on metal articles.

jj. Anodizer - (D. O. T. 501.782) - Controls anodizing equipment to apply corrosion-resistant surface to aluminum.

kk. Plater, Hot Dip - (D. O. T. 501.885) - Tends equipment to coat iron and steel products with corrosion resistant molten non-ferrous metal.

ll. Fluoroscope Operator - (D. O. T. 502.382) - Operates fluoroscope to inspect metal castings for hidden defects such as excessive porosity and subsurface cracks.

mm. Flame Hardening Machine Set-Up Man - (D. O. T. 504.380) - Sets up flame hardening machine for operator according to metallurgical work order specifications, utilizing knowledge of heat-treating methods and metal properties.

nn. Armature Bander - (D. O. T. 724.885) - Operates banding machine to wind steel wire around coil slots in armature core.

oo. Antenna Assembler - (D. O. T. 726.884) - Assembles radio and television antennas using handtools.

pp. Electronic-Sensing Equipment Assembler - (D. O. T. 716.884) - Assembles electrical sensing devices, such as temperature immersion probes, aerodynamic probes, and pitot tubes, using handtools and electronic testing equipment.

qq. Assembler, Clip-On Sunglasses - (D. O. T. 713.887) - Assembles clip-on sunglasses, fitting together parts, such as lenses, spring clips, and metal and plastic frames.

rr. Mill Hand, Plate Mill - (D. O. T. 613.687) - Verifies width of first plate rolled on roughing mill, using width gage.

ss. Die Barber - (D. O. T. 705.781) - Rough-finishes stamping die member surfaces, using abrasive and abrading handtools.

tt. Cathode Maker - (D. O. T. 554-885) - Tends tank and related equipment to coat cathode screens with asbestos for use in electrolytic cells.

uu. Crystal Cutter - (D. O. T. 670.782) - Grinds improperly fitting watch crystals to desired size and to remove rough or chipped edges by holding crystal against revolving abrasive wheel.

vv. Carbon Setter - (D. O. T. 519.887) - Replaces carbon anode of electrolytic cell used in processing aluminum or magnesium.

ww. Blender - (D. O. T. 540.782) - Controls equipment to blend straight run or natural gasoline.

2. Animal and Vegetable

a. Cheese Blender - (D. O. T. 520.487) - Prepares charts of quantities, grades, and types of cheese required for blending to make cheese products. Feels, tastes, smells, and observes cheese for firmness, mellowness, acidity, and color, and selects cheese products for specified blend.

b. Blending Plant Operator - (D. O. T. 520.782) - Controls equipment to weigh and mix vegetable oils for products such as salad oils, shortening and margarine according to formula.

c. Dividing Machine Operator - (D. O. T. 520.885) - Tends machines that automatically divide, round, proof, and shape dough into units of specified size and weight preparatory to baking.

d. Ball Machine Operator - (D. O. T. 520.886) - Feeds automatic rolling machine that forms pliable candy into shapes such as balls or disks. Also known as Candy Roller.

- e. Rice Miller - (D. O. T. 521.138) - Supervises and coordinates activities of workers engaged in milling rice. Reviews instructions covering grade and amount of rice to be milled and plans operations accordingly.
- f. Scrapman - (D. O. T. 520.587) - Separates macaroni scraps recovered from press and packaging areas according to type and condition, for disposal or re-milling, or for sale as hog or poultry feed.
- g. Potato Chip Sorter - (D. O. T. 526.687) - Sorts and discards broken and burned potato chips.
- h. Cocoa Press Operator - (D. O. T. 521.782) - Operates hydraulic press that removes specified amounts of cocoa butter from chocolate liquor.
- i. Battery Operator - (D. O. T. 521.782) - Operates a battery of diffuser cells to extract sugar juice from cossettes (beet skins).
- j. Candy Maker - (D. O. T. 529.381) - Mixes together and cooks candy by following given recipe to meet certain specifications.
- k. Butter Maker - (D. O. T. 529.782) - Controls equipment to make butter by either churn or chill method.
- l. Dairy Processing Equipment Operator - (D. O. T. 529.782) - Sets up and operates continuous flow or vat-type equipment to process milk, cream, and other dairy products.
- m. Cigarette Filter Making Machine Operator - (D. O. T. 529.885) - Tends machine that wraps and cuts cigarette filter plugs.
- n. Sucker Machine Operator - (D. O. T. 529.885) - Tends machine that automatically forms lollipops of specified shape on ends of wooden or fiber sticks. Turns steam valve to heat candy hopper or rollers of candy spinning unit. May roll, knead, and spin candy into strips by hand and feed strips into machine. Sometimes known as Lollipop Machine Operator or Lollipop Maker.
- o. Blender - (D. O. T. 520.687) - Selects various

grades and kinds of tobacco to produce specific blends according to formulas and knowledge of tobacco characteristics.

p. Binder Selector (Tobacco) - (D. O. T. 521.687) - Inspects leaves of tobacco before and after stripping to determine whether leaves are suitable for use as binders.

q. Digester Operator - (D. O. T. 532.782) - Operates battery of stationary or rotary steam digesters to cook wood chips for paper manufacturing.

r. Carbon Paper Coating Machine Set-Up Man - (D. O. T. 534.780) - Sets up and adjusts machine that coats paper with inked wax-oil solution to make carbon paper.

s. Extruder Operator - (D. O. T. 535.885) - Tends one or more extruders that form particle board from wood chips treated with glue.

t. Chip Mixing Machine Operator - (D. O. T. 560.885) - Tends machine that mixes wood chips and glue preparatory to extruding particle board.

u. Compounder, Cork - (D. O. T. 560.887) - Measures or weighs ingredients such as sulfur, zinc oxide, stearic acid, and granulated cork preparatory to mixing into cork composition material.

v. Cork Grinder - (D. O. T. 662.885) - Tends machine equipped with crushing rollers or hammers that reduces woodwork and cork waste to fine particles.

w. Pole-Peeling Machine Operator - (D. O. T. 663.782) - Operates machine to peel bark from logs.

x. Banbury-Mix Operator - (D. O. T. 550.782) - Operates Banbury machine to mix ingredients into compounds for processing into such articles as rubber inner tubes and phonograph records.

y. Beater Engineer - (D. O. T. 530.782) - Controls beater engines and related equipment to process materials used in making paper.

z. Bleacher Man, Pulp - (D. O. T. 533.782) - Starts pumps and handles equipment to bleach pulp used in

paper manufacture.

aa. Corrugator Operator - (D. O. T. 643.782) - Sets up and operates machine to corrugate and face paperboard to form corrugated paperboard material containers.

bb. Molding Sander - (D. O. T. 662.782) - Sets up and operates belt-sanding machine to smoothe wooden molding or contoured wood surfaces.

cc. Sectional Belt Mold Assembler - (D. O. T. 752.884) - Tends machine that presses belts to attain V-shape. Positions assembled molds between twin parallel rollers, using hoist.

dd. Cotton Dispatcher - (D. O. T. 780.884) - Tears or cuts cotton wadding or cushioned material to specified length on cotton roll of width and thickness indicated on work ticket, and tears cotton apart or places form over wadding and cuts around form. Cuts edging to required length.

ee. Foundation Girl - (D. O. T. 784.884) - Positions hats or caps on shaped blocks to steam headware and impart specified size. Also known as Steamer Blocker.

ff. Sewing Machine Operator - (D. O. T. 786.782) - Operates single or multiple needle sewing machine to join parts of such products as awnings, carpets, gloves, textile bags.

gg. Sewing Machine Operator - (D. O. T. 786.885) - Tends sewing machine that automatically joins, reinforces or decorates items such as hats or rugs.

3. Chemical and Synthetic

a. Batch-Still Operator - (D. O. T. 552.782) - Tends batch-stills to separate, by distillation, liquids having divergent volatilization temperatures. May be designated Byproducts Operator.

b. Heat Welder, Plastic - (D. O. T. 553.884) - Fuses together plastic sheets using hot air gun to melt and join edges of sheets.

c. Nitro-Cotton Operator - (D. O. T. 553.884) - Screens and dries nitrocellulose to prepare it for use in making dynamite.

d. Caustic Operator - (D. O. T. 554.884) - Tends equipment to causticize sodium compounds recovered from paper manufacturing processes.

e. Acid Extractor - (D. O. T. 558.782) - Controls equipment such as washers, rectifiers, acid pots, and mixing tanks arranged in series to recover tar acids from coal tar oils.

f. Catalyst Operator - (D. O. T. 559.587) - Engages in preparation of catalyst for use in manufacturing of chemicals such as butadiens and styrene.

g. Absorption Operator - (D. O. T. 551.782) - Controls equipment that absorbs gases and liquids into water or other solvents to produce chemicals such as hydrochloric acid or ammonium hydroxide.

h. Gager - (D. O. T. 712.687) - Sorts and measures strands of surgical sutures according to length and thickness. Places strand on measuring stick to determine length. Inserts each end and center of strand into slot of gage that automatically registers thickness to 0.001 inch and compares gage reading with prescribed limits of acceptable suture thicknesses.

H. UNSKILLED LABORERS - A great number of unskilled workers are employed in manufacturing. With the advent of mass production and the development of assembly line techniques, job simplicity has increased, making it possible and profitable to employ individuals with little or no particular salable skills. These workers may not be required to have high educational qualifications. Often people employed in these areas are required to have only basic communications skills. Usually they have few responsibilities involving data and only meager responsibilities involving people. The earnings in this area are usually lower than average, and the employee is more easily replaced than in skilled or technical areas. Because of the monotony of the work and the lower pay, the turnover rate is higher than in the more skilled occupations.

With the advent of automation, the number of unskilled jobs in manufacturing has steadily decreased. Many manipulative tasks

have been taken over by machines that may be controlled by a magnetic tape, or similar controlling device rather than by individuals. An example of machines displacing people is the River Rouge complex of the Ford Motor Company. In 1929, this plant employed 129,000 people. In 1971, the same plant required only 35,000 employees and were producing more cars per hour. Many unskilled jobs, however, do offer advancement opportunities for those people who are willing to learn a skill.

The jobs listed in this section have been sub-divided into three categories based on the nature of the production involved. These are Mineral, Animal and Vegetable, and Chemical and Synthetic. The listing is a representative sampling of the rather large number of un-skilled occupations found in MANUFACTURING. Wherever possible, the jobs listed are those which can be related to other operations; for instance, an individual operating an extrusion press to form dry-cell battery cores would perform basically the same functions as an operator of a press involved in the extrusion of any other paste or semi-solid substance.

1. Mineral

- a. Laborer, Electroplate - (D. O. T. 500.886) - Assists Plater or works in standardized production operations.
- b. Laborer, General - (D. O. T. 509.886) - Performs any combination of tasks to assist workers engaged in the production of iron and steel.
- c. Caster - (D. O. T. 514.884) - Casts non-ferrous metal into pigs and transports them to storage, using handtools and fork lift.
- d. Foundry Laborer, Core Room - (D. O. T. 518.887) - Performs any combination of tasks involved in coremaking, such as pasting core sections together to form completed core, carrying and loading core in oven, dressing cores, and filling cracks in surface of cores.
- e. Laborer, General (Non-ferrous Metal Alloys) - (D. O. T. 519.886) - Performs any combination of tasks to aid other workers in production of non-ferrous metal products.
- f. Abrasive Grader - (D. O. T. 570.782) - Operates pebble mill to grind emery, rouge, and other abrasives

and separates them according to fineness by water suspension method.

g. Mixer, Diamond Powder - (D. O. T. 570.884) - Combines resin, diamond, and silicone carbide powders to form mixture for use in molding diamond-abrasive grinding wheels, following formulas and using scraper, spatula, plate glass, and gram weight balance.

h. Batch and Furnace Man - (D. O. T. 572.782) - Controls automatic equipment to weigh, mix, and melt ingredients to make glass.

i. Baker, Beads - (D. O. T. 573.884) - Tends oven to bake glass beads used in electrical components.

j. Clay Roaster - (D. O. T. 572.885) - Tends clay roasting kilns and auxillary equipment in which clay, used as filter in treating oil, is cleaned and treated for reuse.

k. Bench Grinder - (D. O. T. 705.884) - Moves metal objects, such as castings, billets, machine parts, and sheet metal sub-assemblies against abrasive wheel of bench grinder to grind, or rough finish objects to specification.

l. Air Conditioning Coil Assembler - (D. O. T. 706.884) - Assembles pre-punched aluminum fin plates and copper tubing to form cooling coils for air conditioning, using handtools and other equipment.

m. Model Builder - (D. O. T. 709.781) - Makes parts for and assembles prototype of metal furniture according to specifications.

n. Hopper Man - (D. O. T. 619.886) - Feeds brass blanks onto conveyors and into hoppers of machines that form blanks into small cartridge cases. Transfers containers of blanks to work area, using hand truck or powered tier-lift truck. Scoops or dumps brass workpieces into feed hoppers of draw presses or into transfer conveyor leading to other work stations using hoist. May hoist container to overhead loading platform and along roller conveyor until it is positioned over machine hopper for dumping.

2. Animal and Vegetable

- a. Almond-Paste Molder - (D. O. T. 520.884) - Colors, kneads, and forms almond paste into decorative shapes such as fruits and flowers.
- b. Batter-Mixer - (D. O. T. 520.885) - Tends machine that mixes ingredients that produce batter for cakes and other bakery products.
- c. Offal Man - (D. O. T. 521.884) - Separates edible portions of an animal from the offal.
- d. Sausage Meat Trimmer - (D. O. T. 521.887) - Prepares meat for use in making ground and smoked meat products.
- e. Barley Steeper - (D. O. T. 522.885) - Tends steeping tanks to saturate barley with water preparatory to germination.
- f. Chip Man - (D. O. T. 522.886) - Shovels beechwood chips from fermenting tanks into a cart.
- g. Batter Scaler - (D. O. T. 526.782) - Sets up and operates machine that deposits measured amount of batter into baking pans.
- h. Doughnut Maker - (D. O. T. 526.884) - Sets up and operates machinery involved in doughnut manufacturing.
- i. Baker Helper - (D. O. T. 526.886) - Performs a combination of assistant duties in a bakery such as moving, dumping, lifting, etc.
- j. Cook - (D. O. T. 526.885) - Tends equipment that bakes, boils, and deep-fat fries meat products to prepare them for further processing.
- k. Candy Cutter, Hand - (D. O. T. 790.887) - Cuts candy into squares using knife consisting of a series of disk blades evenly spaced on a shaft with a handle at each end.
- l. Auto Roller - (D. O. T. 529.885) - Tends machine that automatically rolls cigars.

- m. Cannery Worker - (D. O. T. 529.886) - Works in the canning process and may be involved in dumping, sorting, peeling, and trimming of the product to be canned.
- n. Laborer, Cheesemaking - (D. C. T. 529.886) - Makes and cures cheese. Operates any combination of machinery or hand implements necessary for the task.
- o. Basket Filler - (D. O. T. 529.887) - Removes sealed cans or jars of food products from conveyor and puts them into baskets.
- p. Core Treater - (D. O. T. 534.887) - Treats paper cores with mixture of turpentine and beeswax.
- q. Bleacher - (D. O. T. 562.885) - Tends equipment that bleaches and dyes broomcorn used in making brooms.
- r. Four-Corner-Stayer Machine Operator - (D. O. T. 641.885) - Quad Stayer, Staying Machine Operator. Tends machine that folds and tapes corners of cardboard box blanks to form containers; bolts box forms to machine rack using wrench, and adjusts walls of well to correspond to size of box form. Places reels of tape on machine feeder rack and threads tape through feed and moisture rolls. Starts machine and loads scored box blanks into automatic feed rack. Stacks formed boxes on pallets as they are ejected from machine. May position boxes on gummed wrapper as they are discharged from machine.
- s. Bindery Worker - (D. O. T. 643.885) - Tends various binding machines to perform duties involved in binding books, magazines, pamphlets, directories, and catalogs.
- t. Banbury-Mix Helper - (D. O. T. 550.885) - Weighs material such as crude rubber, plastic compounds, and oil, and places them on conveyor to charge Banbury Mixer. Works under direction of the Banbury-Mix Operator.
- u. Heel Builder, Hand - (D. O. T. 788.887) - Cements and nails lifts to form heels. Presses and moves leather or fiberboard lift against cement covered roller. Stacks cemented or non-cemented lifts according to material, size, and style as specified to form heel. Hammers holding nail through stacked lifts. May place cemented heels in press to dry.

v. Cotton Roll Packer - (D. O. T. 920.885) - Tends machine that packs absorbent surgical cotton rolls in cardboard cartons for shipment. Places empty shipping cartons on conveyor rollers. Pushes button to start automatic cotton layer machine that rolls absorbent cotton between paper. inserts rolled cotton into cardboard container. Fills shipping cartons with containers and places glued paper tape on top to seal cartons.

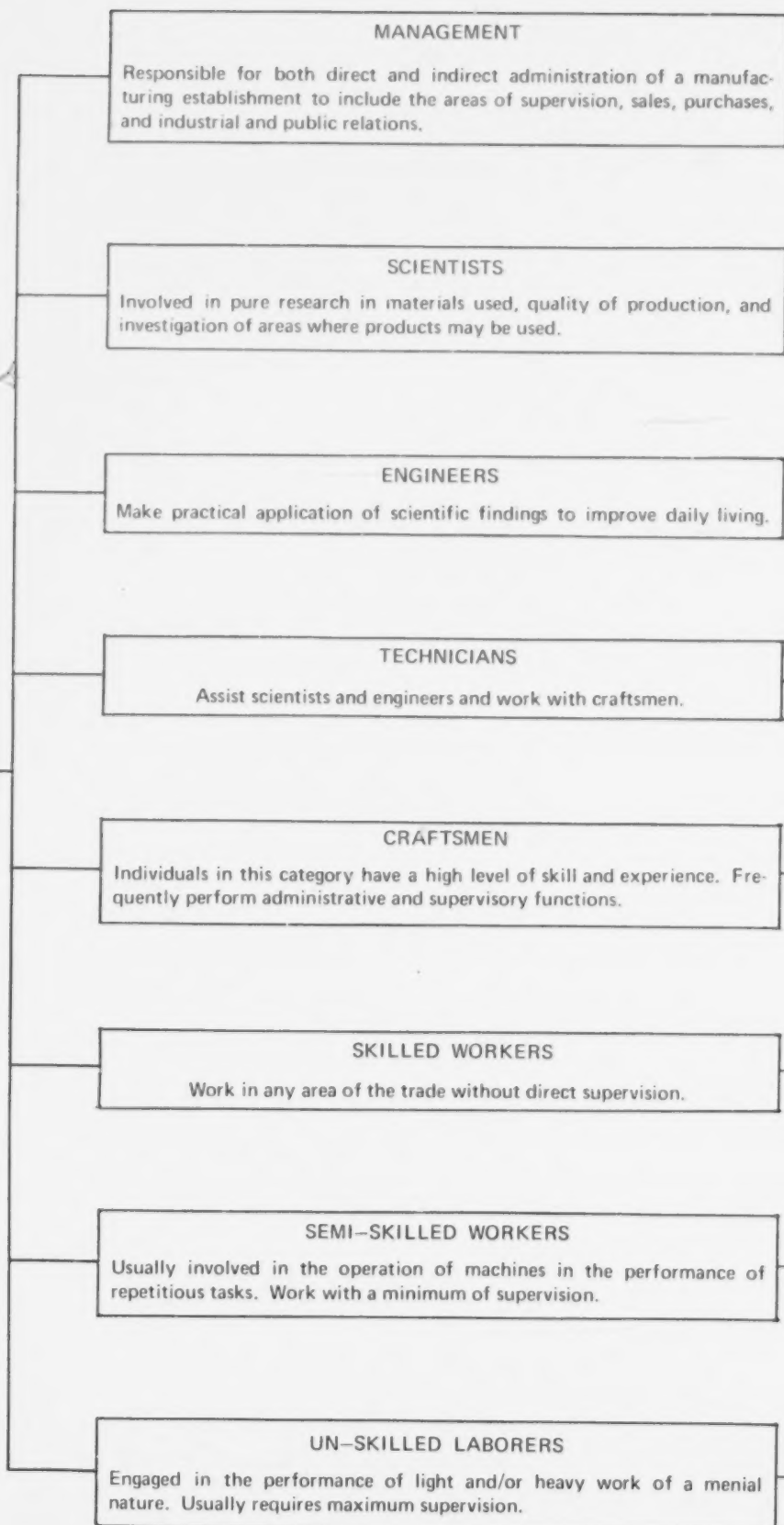
3. Chemical and Synthetic

a. Dry-House Man - (D. O. T. 553.585) - Tends drying room in which pyrotechnics are cured, dried or stored. Stores trays on racks according to date of processing.

b. Core Extruder - (D. O. T. 557.885) - Tends manually operated extrusion press and wire cutter to extrude and cut paste (black mix) to form dry cell battery cores.

c. Ampoule Sealer - (D. O. T. 559.887) - Seals ampoule filled with liquid drug products preparatory to packaging.

MANUFACTURING

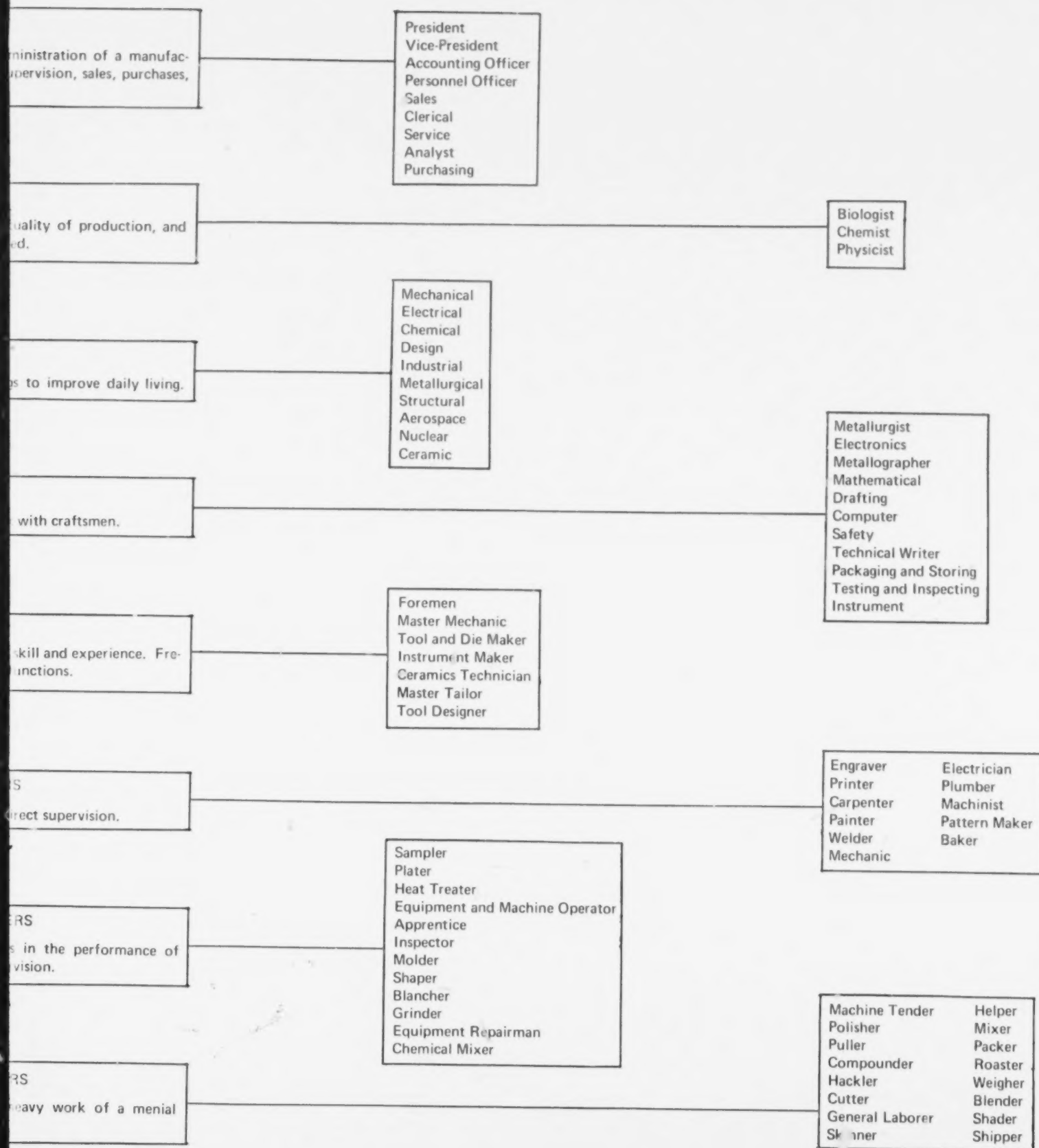


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MARINE SCIENCE



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MARINE SCIENCE

I. INTRODUCTION

Man is an endangered species as an expanding population continues to deplete land, mineral, and food resources. If mankind is to survive on this planet, new resources must be found in the near future. As a result of this necessity, science and industry have joined efforts to explore and develop the vast, virgin ocean frontiers as a source to replenish the diminishing land resources.

Marine Science is the occupational cluster that identifies those jobs related to the discovery, cultivation, and harvesting of food and minerals from fresh and ocean waters. The fishing industry is probably the most widely known and developed job family in this cluster. Many jobs in this cluster are involved with research and development of marine industries. For example, fish farming in the open seas and ocean mining are experimental industries which will create jobs in the future. Marine engineering and technology are involved with designing and constructing the many specialized instruments and vessels required to explore and harvest marine resources.

This pamphlet will permit students to investigate jobs in eight job families: Research, Mineral and Chemical Extraction, Offshore Drilling, Fishing, Aquaculture, Marine Engineering and Technology and Surface and On-Shore Support.

II. METHODOLOGY

Information for this occupational cluster was compiled from available literature at Austin College, Sherman, Texas, and the University of Texas, Dallas, Richardson, Texas. Additional information was requested and received from The National Oceanic and Atmospheric Administration of U.S. Department of Commerce, The International Oceanographic Foundation, and The National Oceanography Association.

Several publications provided information for this research:

Gullion, Edmund A., Editor. Uses of the Sea. Prentice-Hall, Inc. (Englewood Cliffs, N.J., 1968).

U.S. Department of Labor. Dictionary of Occupational Titles, Volumes I and II. (Washington D.C., 1965).

National Oceanic and Atmospheric Administration. NOAA Career Opportunities. U.S. Department of Commerce. (Washington, D.C., 1971)

U.S. Department of Labor. Employment Outlook: Environmental Scientists. A Reprint from the Occupational Outlook Handbook, 1970-71 edition. (Washington, D.C., 1971).

International Oceanographic Foundation. Training and Careers in Marine Science. (Miami, Florida, 1970).

Superintendent of Documents. Industry and Technology, Volume II: Panel Reports of the Committee on Marine Science, Engineering, and Resources. (Washington D.C.).

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual Job Families, with a listing and discussion of the function of individual occupations, are listed below:

A. RESEARCH - Many scientists believe the seas hold the solutions to the problems of diminishing land resources. But before the oceans can be developed as a food source, men must have a better understanding of sea life and its physical environment. Industry must develop new recovery methods before minerals and chemicals can be economically extracted from the ocean. To meet these needs, the federal and state governments, with private industry, are investing large resources in marine research.

Occupations in marine research are involved in the study and development of marine life and resources for scientific and commercial purposes. People involved in marine research may be employed in academic positions or in laboratory stations operated by a federal or a state agency. They may also be employed in commercial or industrial organizations. Most occupations in this job family require specialized skills and training. A person employed in marine research may work on-shore, on a surface support vessel, or underwater.

1. Aquatic Biologist - (D.O.T. 041.081) - Studies aquatic plants and animals and the environmental conditions that affect them. Investigates the environmental changes and ocean depths to determine the different forms of plant and animal life that exist at various levels.

Studies various types of marine life and the food-chain relationships. An Aquatic Biologist may specialize in a variety of areas. A Limnologist is a biologist who specializes in fresh-water aquatic life. A Marine Biologist specializes in salt-water life. An Ichthyologist specializes in the study of fish. A Marine Botanist specializes in aquatic plant life. A Marine Zoologist specializes in aquatic animal life. A Marine Ecologist studies the environmental conditions and changes which affect the aquatic and estuaric life-chain and balance.

2. Marine Geophysicist - (D.O.T. 024.081) - Studies the physical aspects of the oceans such as density, temperature, and ability to transmit light and sound. Investigates seismic, gravitational, thermal, and magnetic forces which affect ocean movement and properties. Investigates and charts the flow patterns of tides and currents of the ocean. Studies the relationship between the sea and the atmosphere. Analyzes and compiles data concerning the ocean floor. Compiles data to prepare navigational charts and maps.

3. Marine Geologist - (D.O.T. 024.081) - Studies the composition, structure, and history of rocks and sediment on the ocean floor. Helps locate mineral, petroleum, and gas deposits under the ocean floor. Applies geological knowledge to engineering problems encountered in construction projects such as dams and underwater tunnels. Prepares reports that analyze and summarize geological exploration for scientific and industrial use.

4. Marine Meteorologist - Studies the interaction of the atmosphere and the ocean, and the process by which weather over the ocean is generated. Compiles and analyzes weather data gathered from satellites, radar, and sensor-bearing balloons. Prepares a variety of weather forecasts for general public use and for specialized groups such as pilots, mariners, and farmers. May serve at an on-shore weather station or aboard an ocean-going vessel. See PUBLIC SERVICE.

5. Hydrographer - (D.O.T. 025.288) - Measures rainfall and river-flow at metering stations. Takes water samples for analysis and prepares reports of hydrographic data. Measures rate of waterflow at various depths with measuring devices. Records depth and flow readings taken at various locations. Prepares graphs and charts to show trend in waterflow pattern at metering stations.

6. Hydrologist - (D.O.T. 024.081) - Studies distribution, disposition, and development of waters in land areas. Studies the form and intensity of precipitation and modes of return to the ocean and atmosphere. Charts the waterflow and disposition of sediment. Measures changes in water volume due to evaporation and melting snow. Studies storm

occurrences and also, nature and movement of glaciers. Determines rate of ground absorption and ultimate disposition of water. Evaluates data obtained concerning such problems as flood and drought forecasting and soil and water conservation programs. Helps plan water supplies, water power, flood control, drainage, irrigation, crop production, and inland navigation projects.

3. CHEMICAL AND MINERAL EXTRACTION - This job family includes jobs that prospect, develop, and extract chemicals and minerals from ocean water or from the ocean floor. It is not extensively developed. The extraction processes are basically the same as other mining and chemical processes used to extract minerals and chemicals from raw material.

1. Ocean Mining - See AGRI-BUSINESS AND NATURAL RESOURCES for occupations related to Mining.
2. Chemical Extraction - See MANUFACTURING for occupations related to Industrial Chemical Extraction.

C. OFF-SHORE DRILLING - Off-shore drilling operations are conducted by most gas and oil producers. Drilling operations are performed in the open sea from stationary platforms or floating rigs. The petroleum industry continues to survey the ocean floor for oil and gas deposits. See AGRI-BUSINESS AND NATURAL RESOURCES for occupations in this job family.

D. FISHING - Commercial fishing includes occupations that locate, harvest, process, and market animal and plant life from the sea. Fishing is the most extensively developed job family in this cluster. Also, it is probably the best known job family to the lay public.

In this job family, people work in occupations that locate and develop fisheries (or fishing grounds). Some are involved in harvesting and processing marine life for commercial purposes, including marketing and food technology. This job family includes occupations that catch shellfish or finfish by any method. Fishing also includes seaweed harvesting, although this industry is not widely developed. Processing and marketing marine products are basically the same as other food industries.

1. Clam Dredge Operator - (D.O.T. 431.782) - Sets up and operates hydraulic clam dredge aboard a barge or ship to harvest clams at low tides. Lowers dredge into water using hoisting boom and winch, and starts pumps that force water through jets to loosen sea bottom and facilitate dredging operations. Manipulates levers to open and close dredge basket or to drag the basket along the bottom of the water, forcing the clams into wire baskets. Hoists dredge basket with

hoisting boom and winch and dumps contents onto deck or conveyor belt. Removes marketable clams from contents dumped from dredge basket and deposits them in containers for shipping. Assisted by a Clam Dredgeman (Clam Dredge Operator Helper), adjusts, repairs, and maintains dredge and conveyor equipment. Dredge may be designated by species of marine life which is being sought.

2. Clam Dredgeman - (D.O.T. 439.687) - Removes marketable clams from conveyor belt or from pile on deck of clam-harvest-dredge and deposits them in containers for shipping. Sorts and packs clams in containers for shipping according to species. May assist Clam Dredge Operator in adjusting, repairing, and maintaining dredge and conveyor equipment.

3. Fisherman, Pot, Trap - (D.O.T. 431.884) - Catches fish by constructing, setting, and baiting floating or stationary fish traps, or pots. Fishes for marine life such as crab, eel, or lobsters, using pots (cages with funnel-shaped net openings). Ties marker float to line, attaches line to pot, fastens bait inside the pot, and lowers pot into the water. After a period of time, pulls up pot. Reaches through hinged door and removes catch. Measures catch with fixed gage to insure that catch meets legal size requirements. Places catch in container and tosses illegal catch overboard. When catching lobster, places peg in hinge of claws to prevent lobsters in container from killing each other. May be designated by type of marine life which is being fished. May work alone or in two-man crew.

4. Fisherman, Line - (D.O.T. 432.884) - Catches marine life with hooks and line called a trot, trawl, or troll line. Fishes for fish from land or from vessel. Lays out line and attaches hooks, bait, sinkers, and various anchors, floats, and swivels, depending on quarry sought. Chops bait and attaches it to hooks. Lays lines in tubs in such a manner that they can be thrown out without fouling. Attaches end of set line to buoy or on board, and throws out line from position on vessel. Secures other end to anchor. Returns to lines after designated period, and hauls catch aboard boat or on land.

5. Fisherman, Spear - (D.O.T. 433.884) - Catches fish such as eels, salmon, and swordfish, using barbed spear or harpoon. Spears fish from platform built in stream or on river bank, or from platform on fishing vessel. Uses spear or harpoon attached to rope. Hoists fish from water, using gaff. Kills swordfish with club, rifle, or gaff. May be designated Gaffman, Harpooner, or according to quarry sought.

6. Fisherman, Diving - (D.O.T. 439.884) - Gathers sponges, abalone,

or pearl oysters from sea bottom, wearing diving or scuba gear. Climbs overboard or is lowered into water from boat by lifeline. Picks up quarry from sea bottom, places it in bag attached line from boat, and tugs on line to have bag pulled to surface. May be designated according to quarry sought.

7. Sponge Gatherer - (D.O.T. 437.884) - Gathers sponges from sea bottom, using pronged hook attached to end of pole, wading or using boat. Tears sponges from their base with hook, or knife, and places them in a bag to be pulled to the surface or onto a vessel.

8. Kelp Cutterman - (D.O.T. 437.887) - Cuts kelp or other seaweed from sea bottom using mower (cutter equipped with oscillating knives). Lowers mower into water from kelp-harvesting boat and starts mower to cut kelp. Attaches grabhook on wench to kelp, after the vegetation is dropped into bow of boat during harvesting, so that kelp accumulates in boat. When concerned only with attaching kelp to grabhook, is designated as Kelp Hookman.

9. Seal Hunter - (D.O.T. 439.884) - Captures seals for commercial uses by using club, rifle, harpoon, or trap. Kills seals for pelts, using clubs. Rounds up bachelor seals, using pole to prod them and keep them together. Drives male seals inland to killing grounds and sorts droves into small groups. Kills male seals that are within specified age and size limits by striking them with club. Severs skin around head and flippers of dead seal, using knife. Pins seal's skull to ground with metal bar and pulls off seal pelt from head to tail. Loads pelts into trucks for transportation to plant for cleaning and curing. At plant site, washes pelts in sea water, scrapes fat and blubber from pelts, using hand scraper. Cures pelts in salt or brine, sprinkles boric acid on skin side of pelt to prevent bacterial development and packs and salts pelts in barrels for shipment. May be designated according to tasks performed. Sealing operations are controlled by U.S. Fish and Wildlife Service.

10. Walrus Hunter - (D.O.T. 451.884) - Kills walruses using rifle. Usually stands behind lump of ice and attempts to kill each animal with single shot.

11. Fish Icer - (D.O.T. 222.587) - Weighs out dressed fish. Records weights and packs fish in ice. Reads orders to determine quantity, size, and variety of fish to be packed. Selects fish, weighs them and prepares them for shipment. Shovels layer of ice in box and fills body cavity of each fish with ice. Places fish in box and fills remainder of box with ice. May assemble boxes, stencil addresses on them and and the packed boxes with metal straps.

12. Sponge Clipper - (D.O.T. 437.887) - Removes shells and other particles from sponges prior to packing and shipping. Chips the torn parts or irregularities from sponges with shears, usually doing the clipping while the sponge is wet. Cuts into desired size with serrated-edge knife.

13. Shellfish Shucker - (D.O.T. 521.887) - Shucks fresh or steamed shellfish such as oysters, clams, or scallops, preparatory for canning, freezing, or fresh packing. Hold shellfish firmly or against block and forces shucking knife between halves of shell and hinge juncture. Twists knife to sever muscles holding shell closed, and pries open. Cuts shellfish from shell, flips it into containers and discards shell. May break edges of shells before shucking, using hatchet. May be designated according to shellfish shucked.

14. Fish Cleaner - (D.O.T. 525.884) - May be called a Fish Dresser, Fish Butcher, Fish Cutter, Fillet Cutter, Fish Scaler, Fish Splitter, or any variety of jobs related to the cleaning and butchering of fish for processing. Cleans fish aboard ship or ashore, performing any combination of tasks, alone or as a member of crew. His duties may include: scrapes scales from fish with knife, cuts or rips fish from vent to throat with knife and tears out viscera and gills, cuts off head of fish with knife, drops head in tub and slides fish along table to next worker. Washes blood from abdominal cavity by dropping fish in tub of water or by using hose, and removes discolored membrane from abdomen lining with knife, spoon, scraper, glove, or piece of burlap. Cuts gashes along sides of fish to facilitate salt penetration during curing. Cuts fish behind gill slits and draws knife along backbone and ribs to free fillet. Lays fillet skin-side down on table and draws knife laterally between skin and flesh to remove skin. Slices flesh from bones in fletches (longitudinal quarter sections) for further processing into boneless slices of fish. May unload catch from vessel. May pack fish in containers. May remove slime from skin or scales.

15. Fish-Machine Feeder - (D.O.T. 521.886) - Feeds cleaned fish into machines that bone, skin, or cut and pack fish sections in cans or cartons. Inspects fish to insure that color, odor, and texture meet standards. Places fish on feed conveyor of machine. May start machines and pull levers to regulate feed conveyor speed. May be designated according to machine fed: Filleting Machine Feeder, Fish-boning Machine Feeder, Fish-Cutting-Machine Operator. Fish-Skinning Machine Feeder, or according to activity performed such as Fish Flipper, or Fish Straightener.

16. Shellfish-Processing-Machine Tender - (D.O.T. 529.885) - Tends washing, blanching, steaming, brining, peeling, or shucking machine

that prepares shellfish for canning, freezing, or fresh packing. Opens valves to admit water, steam, or air under pressure into machine vats and adds specified quantities of additives such as salt or food coloring. Lowers basket of shellfish into vats by hand or hoist, or pushes shellfish into steamer chamber. Starts conveyors that move product through machines. May turn screws to adjust tension of peeler, using wrench. May be designated according to machine tended or shellfish processed.

E. AQUACULTURE - Aquaculture is an expanding industry that attempts to raise aquatic plants and animals in a controlled environment or a modified ecological system. Aquaculture is also identified as fish farming. It involves any job that cultivates, harvests, and markets food stuffs from fresh or ocean water. Oysters, shrimp, catfish, and trout farming are established enterprises. Aquaculture includes fish hatcheries operated by federal or state agencies. Occupations in this job family range from specialized technicians to unskilled labor classifications.

1. Fishery Bacteriologist - (D.O.T. 041.081) - Conducts laboratory research and experiments to discover ways to control bacteria and other micro-organisms harmful to fish. Analyzes samples of water from streams, lakes, and other watercourses to detect presence of harmful micro-organisms, using microscope, centrifuge, and other laboratory equipment. Studies biology, ecology, physiology, and morphology of micro-organisms identified with diseases of fish. Ascertains effectiveness of chemical and bacteria which are destructive to harmful micro-organisms but not toxic to finfish or shellfish.

2. Fish Culturist - (D.O.T. 041.168) - May be designated as Fish-Hatchery Superintendent, Foreman, or Pisciculturist. Supervises and coordinates activities of workers engaged in cultivating fish for use in stocking streams and ponds. Collects, compiles, and interprets data concerning fish habits, growth, migration, food, and enemies, and devises methods of control. Studies water conditions where fish breed and spawn, and directs fabrication of such conditions in hatchery or fish farm ponds. Devises techniques for collecting, fertilizing, and incubating spawn. Oversees treatment of spawn and fry. Supervises activities of others engaged in feeding and sorting of fish, and liberation and transfer of fish from stocking streams and ponds. May be designated according to type of fish cultivated such as Food-Fish Culturist or Game-Fish Culturist. See AGRI-BUSINESS AND NATURAL RESOURCES.

3. Fish-Culturist Assistant - Assists in the operation and maintenance of a fish farm or fish hatchery. Distributes the fish hatched in hatchery to restock the waters of the state, or the ponds and beds of the fish farm. Observes the activity of the fish to determine their habits and

and food requirements and their growth. Regulates the temperature, depth, and other factors of the reservoirs, ponds, and dams. Feeds the fish according to the instructions and data obtained. Collects, sorts, and transfers fish to holding ponds or other waters. Constructs reservoirs, ponds, dams, flumes, and other hatchery or fish farm equipment. May assist with activities in the hatching, caring for, and feeding of fry.

4. Hatchery Man - (D.O.T. 436.884) - Performs his work in a fish hatchery. Feeds fish by scattering food on surface of water. Regulates temperature of indoor tanks. Sorts fish according to size, coloring, and species. Transfers fish to proper tanks with dip nets. Cleans tanks by draining out water, shoveling out muck and debris, and scrubbing sides of tanks with wire brush. See AGRI-BUSINESS AND NATURAL RESOURCES.

5. Alligator Farmer - (D.O.T. 436.181) - Raises alligators in controlled environment. Feeds alligators and allows them to grow to desired sizes in tanks or pens. Kills animals and sells their hides for making luggage, shoes, and other leather products.

6. Frog Farmer - (D.O.T. 436.181) - Raises frogs suited for food, in controlled environment. Feeds frogs intensively. Kills frogs and removes edible legs. Ships iced legs to market. Sells live frogs as breeding pairs or scientific specimens, and sells tadpoles as fishing bait.

7. Fish Farmer - (D.O.T. 436.181) - Raises finfish such as trout, catfish, and salmon in stock ponds. Strips eggs from female fish and places eggs in moist pan. Adds milt (reproductive glands and semen of fishes) stripped from male fish, to fertilize eggs. Allows eggs to swell and harden, indicating that fertilization has taken place. Moves fertilized eggs to hatching boxes through which aerated water flows, to allow eggs to develop into fry. Transfers fry to rearing ponds. Feeds fry high protein foods such as ground beef liver, slaughterhouse offal, or daphnia. Permits fry to grow to specified fish size for stocking lakes. Counts fish. May perform standard tests of water samples to determine oxygen content. In a privately owned fish farm, the fish farmer may supervise the slaughter, butchering, processing, and marketing of the fish. See AGRI-BUSINESS AND NATURAL RESOURCES.

8. Shellfish Grower - (D.O.T. 436.181) - Cultivates and harvests beds of shellfish as clams, oysters, and shrimp. Lays out and stakes tide flats (ground beneath shallow water near shoreline). Piles up stone, poles, and mud, using farm tractor and hand implements to make dikes to control water drainage at low tide. Removes debris

by hand and levels soil by tractor and harrow. Sows spat (young shellfish) by hand or with shovel. Covers seeded area with mixture of sand and crushed shell. Rigs net or star mop (mop of heavy rope yarn) and drags it over bed behind power boat to entangle and remove shellfish predators. Walks about bed at low tide and scoops or digs shellfish from bed and piles them on barge or mud sled. Packs shellfish, according to market specifications, in containers and returns small ones to bed. May supervise workers who cultivate and harvest beds. May negotiate with buyers for sale of crop.

9. Shellfish-Bed Man - (D.O.T. 436.884) - Cultivates and harvests shellfish by performing any combinations of duties. Loads marking stakes on barges and poles barge to shellfish bed. Drives stakes into mud in pattern specified by shellfish grower. Sows spat by scattering them within staked enclosure. Covers seed area with mixture of sand and broken shells, onto which spat attaches. Wades in to cultivate shellfish bed and digs for shellfish with fork, spade, or rake. Treads in water and feels for shellfish with bare feet, picks them up and drops them in container. Reaches from boat with rake-tongs and gropes for shellfish by moving handles to open and close tongs. Drags brail fork (pipe with series of hooks attached) behind powerboat to pull shellfish from mud. Rigs and lowers dredges into shellfish bed using block and tackle. Picks out market-size shellfish from catch and replants smaller ones. Packs and ices marketable shellfish in containers for shipment. Unloads loose shellfish from boat using shovel.

F. MARINE ENGINEERING AND TECHNOLOGY - Marine research as well as growing demands to locate and develop new fisheries, have required that research and industry develop new machines and instruments to collect, sort, analyze, and store marine environmental data. Earth-orbiting satellites with new sensors, undersea and surface-data-collecting buoys, and undersea-life-detecting instruments require constant surveillance and monitoring. Research ships, submersibles, and new fishing fleet ships require a great deal of specialized technology and engineering. Marine engineers and electronic specialists design and build systems, devices, and instruments used in oceanographic research and operations.

1. Marine Architect - (D.O.T. 001.081) - Designs and oversees construction and repair of marine craft and floating structures such as ships, barges, tugs, dredges, submarines, floats, and buoys. Studies design proposals and specifications to establish basic characteristics of craft such as size, weight, speed, propulsion, armament, cargo, displacement, draft, crew and passenger compartments, and fresh or salt water service. Oversees construction and testing of prototype in model basin and develops sectional and waterline curves of hull and superstructure according to specification and test data.

Designs layout of craft interior including cargo space, passenger compartments, ladder wells, and elevators. Confers with Marine Engineers to establish arrangement of boiler room equipment, propulsion machinery, ventilation systems, refrigeration equipment, piping and other functional equipment.

2. Marine Engineer - (D.O.T. 014.081) - Designs and oversees construction of marine powerplants, propulsion systems, heating and ventilation systems, and other mechanical and electrical equipment in ships docks, and marine facilities. Studies drawings and specifications and performs complex calculations to conceive equipment and systems designed to meet requirements of marine craft or facility. May specialize in design of equipment.

3. Marine Draftsman - (D.O.T. 014.281) - Performs duties of Draftsman. See CONSTRUCTION: Managerial and Engineering.

4. Marine Electronic Specialist - Uses and monitors a variety of electronic and mechanical equipment and sensory instruments. May assist in installing maintaining, repairing and operating radio, radar, sonar, telemetering, underwater television, or similar communication and data collecting devices that measure, record, indicate, and control research, navigational and meteorological instruments, electronic computers, and other types of electronic equipment. May specialize in a variety of tasks and jobs.

5. Skin Diver - (D.O.T. 379.884) - May be designated as Frog Man, Salvage Diver, Scuba Diver. Performs various underwater jobs, wearing insulated suits and wearing pressure tanks containing air supply. Dons mask, flippers, and aqualung, or similar self-contained air supply as well as insulated suit if water is deep or cold. Swims from boat, dock, or shore, to job site. Dives to locate or recover submerged objects such as automobiles, boats, logs, bodies, or other objects. Swims to bottom and scans river bed or ocean bottom for objects sought. Attaches lines or chains around heavy objects and fastens to lowered hook. Picks up light-weight objects and swims to surface. May use safety line, and communicates with tender by jerking on line. May perform repair work on underwater installations. May engage in firefighting activities.

6. Diver - (D.O.T. 899.281) - Works below surface of water with air line and communication lines to surface, to inspect, repair, remove, and install equipment structures. Descends in water with aid of Driver Helper. Communicates with surface by signal line or telephone. Inspects docks, ship-bottoms and propellers. Makes minor

repairs on vessels beneath waterline. Cuts and welds steel, using oxyacetylene cutting torch and arc-welding equipment. Cleans debris from intake and discharge strainers, water strainers, or ships. Removes obstructions from marine railway or launching ways. Levels rails by driving wedges beneath track with maul or sledge hammer. Removes launching cradles and sliding ways from keels of newly launched vessels, using power and hand tools. Places rigging around sunken objects and hooks rigging to crane line. Rigs explosives for underwater demolitions. Searches for lost, missing, or sunken objects, such as bodies, torpedoes, sunken vessels, and equipment. Places recording instruments below surface of water preparatory to underwater tests or experiments. May set sheet pilings for cofferdams. May drill holes in rock for blasting. May work in flooded mines.

7. Diver Pumper (Helper) - (D.O.T. 899.884) - Operates air pumping unit to maintain constant air pressure for diver, while diver is underwater. Assists diver to dress in diving equipment. Checks to see that air and communication lines are in proper working order. Supplies tools and other equipment when requested by diver.

G. SURFACE AND ON-SHORE SUPPORT - The marine science occupations require a wide variety of on-shore personnel that maintain, service, and repair surface and sub-surface vessels. The fishing industry requires personnel who market and distribute aquatic produce. Many jobs in marine science are connected with research laboratories operated by state and federal agencies and private industry.

1. Marine Engine Machinist - (D.O.T. 623.281) - Installs and repairs gasoline and diesel engines in boats, yachts, tugs, and trawlers, following specifications. Installs engine controls, propeller shaft, and propeller. Attaches test instruments, starts engine, and records operating data, such as revolutions per minute and voltage output. Disassembles defective engines and repairs or replaces damaged parts.

2. Machinist, Outside - (D.O.T. 623.281) - Installs ship machinery, such as propelling machinery, auxiliary motors, pumps, ventilating equipment, and steering gear, working from blueprints and using hand-tools, calipers, and micrometers. Lays out passage holes, bulkheads, decks, and other surfaces for connections such as shafting and steam lines. Installs below-deck auxiliaries, such as evaporators, stills, heaters, pumps, and equipment, during dock and sea trials. May set up and operate such machine shop tools as lathe, boring mill, planer, shaper, slotter, and milling machine, to fabricate replacement parts.

3. Motorboat Mechanic - (D.O.T. 623.281) - Repairs and adjusts

electrical and mechanical equipment of gasoline power motorboat engines, using handtools, powertools, and electrical testing meters. Starts motors and listens to sound to locate cause of trouble. Tests motor for conformance to manufacturer's specifications. Dismantles motors, using handtools, and examines parts for defects. Adjusts generator and replaces faulty wiring, using handtools and soldering iron. Installs piston rings, adjusts carburetor, grinds valves, repairs and replaces reduction gears and other parts. Using lathe, drill press, handtools, and powertools, examines and repairs defective propeller and propeller shafts. Aligns engine to propeller shaft. May repair only mechanical equipment of engines. May be designated according to type of engine such as Inboard Motorboat Mechanic, Outboard Motorboat Mechanic.

4. Motorboat-Mechanic Helper - (D.O.T. 623.884) - Assists Motorboat Mechanic by performing lesser skilled tasks involved in the repair of gasoline-powered motorboats. Removes pumps, generators, and other engine accessories, using handtools, dismantles engine by removing enginehead and oil pan. Removes covers of gears and clutch units or removes entire assemblies as instructed. Cleans disassembled parts by washing in solvent. Assists in reassembly of repaired engines.

5. Motorboat Operator - (D.O.T. 911.883) - Operates motordriven boat to carry passengers and freight, takes soundings in turning basin, serves as liaison between ships, ship and shore, harbor and beach area patrol, tows, pushes, or guides other boats, barges, logs, or rafts. Casts off securing lines and starts motor. Moves gear lever to place boat in forward or reverse motion, and steers boat with helm or tiller. Maintains equipment, such as range markers, fire extinguishers, boat fenders, lines, pumps, and lubricating parts. Cleans boat and repairs hull and superstructure, using handtools, paint, and brushes. May tune up, overhaul, or replace engine. May give direction for loading and seating in boat. May be designated according to type of boat operated such as Boat Tender, Charter-Boat Operator, Sight-Seeing Operator, Water-Taxi Driver; or may operate motor-driven boat to haul fish or other marine life from off-shore fishing vessel to buyer and be designated Run-Boat Operator.

6. Dockmaster - (D.O.T. 891.138) - Supervises and coordinates activities of workers engaged in drydocking vessels for painting, cleaning, and repair. Analyzes vessel's blueprints and specifications to determine size, shape, and number of keel and bilge blocks required to support vessel. Directs Dockman in assembling, positioning, and securing blocks to floating-drydock-platform, marine railway or floor of graving dock. Takes sights to establish reference points for positioning vessel over blocks, using transit, and directs Dockman in

aligning vessel over blocks. Directs workers in pumping operations to raise vessels, and in positioning, flooding, and pumping caisson (gate) in graving dock. Supervises flooding operations and removal of vessels from drydock.

7. Dockman - (D.O.T. 891,884) - Performs flooding duties concerned with drydocking and cleaning exteriors of ships, as well as maintenance of drydock and piers: Positions keel blocks on dock platform and builds bilge blocks as directed by Dockmaster, using handtools and clamps. Opens flood valves in floating drydock section to submerge platform. Takes up docking lines, using winch, or snubs lines over dock cleats to position ship over drydock. Starts pumps to remove water from drydock sections and turns pump controls to keep dock platform on even keel. Washes or steam-cleans exterior of ship's hull to remove marine growth and loose paint, using high-pressure water hose or steam-cleaning equipment. Scrapes barnacles or other marine growth from hull with long-handled scraper, and chips rust or paint from hull with pneumatic tool. Erects stages and scaffolds on drydock, when removing ship from dock, to keep dock platforms on even keel as they are submerged. Floods or drains caisson of graving drydock, and assists floating caisson in or out of position across drydock entrance.

8. Manager, Marine Service - (D.O.T. 187,168) - Directs activities of boat repair service, according to knowledge of maintenance needs of small craft and marine safety requirements: Confers with owner or crew of vessel to obtain maintenance history and details concerning condition of craft. Observes and listens to vessel in operation to detect unsafe or malfunctioning equipment and leaks or other flaws in hull or superstructure. Performs tests on vessel and equipment using gages and other standard testing devices. Estimates cost of repairs according to familiarity with labor and materials requirements or fee schedule. Supervises and coordinates activities of workers engaged in repairing, painting, and otherwise restoring vessels to seaworthy condition. May repair vessels, assisted by other workers.

9. Seamen, Sailots, Deckhands, Vessel Operators, Etc. - See TRANSPORTATION; Water Transportation.

10. Fishing Industry: Management, Sales, Advertising, and Distribution - See MARKETING AND DISTRIBUTION; BUSINESS AND OFFICE.

11. Computer Managers and Computer Data Specialists - See BUSINESS AND OFFICE.

12. Laboratory Chief - (D.O.T. 976,131) - A term applied to persons who serve as administrative heads of chemical, physical, electrical,

biological, or other scientific laboratories. Directs activities of personnel engaged in testing or developing products, processes, or production equipment, or in making routine analysis of products during processing. Establishes and directs operations of laboratory control systems. Approves modifications of procedures. Assigns and reports, and approves or rejects release of raw materials to plant for production, use, or release of finished products for shipment. Compiles periodic reports on laboratory activities and advises management on means of improving products.

13. Laboratory Tester - (D.O.T. 029.181) - May be designated as Chemical Analyst; Chemist, Assistant; Laboratorian; Laboratory Man; Laboratory Sampler; Research-Laboratory Technician; Research Technician; Tester. Performs laboratory tests according to prescribed standards to determine chemical and physical characteristics or composition of solid, liquid, or gaseous materials, and substances for purposes such as quality control, process control, product development, or determining conformity to specifications. Sets up and adjusts laboratory apparatus, and operates grinders, agitators, centrifuges, ovens, condensers, and vibrating screens, to prepare material for testing according to established laboratory procedure. Performs physical tests on samples of raw materials and controls quality of materials and mix during manufacturing process. Tests raw materials. Tests dry and liquid substances used as ingredients for purity, viscosity, density, absorption or burning rate, melting point or flash point. Tests materials for presence and content of elements or substances such as hydrocarbons, manganese, natural grease, or impurities. Tests samples of manufactured products. Examines materials, using microscope. Records test results on standard forms, writes test reports describing procedure used, and prepares graphs and charts. Cleans and sterilizes laboratory apparatus. May prepare chemical solutions according to standard formulas. May add chemicals or raw materials to process solutions or produce batches to correct deviations from specifications.

14. Laboratory Tester II - (D.O.T. 029.381) - Performs standardized tests to determine quantity or quality of physical or chemical properties in food products, or to insure compliance with company and government quality standards using laboratory equipment. Tests food products and food specialties and their preservatives, and frozen foods for chemical or nutritional values, using centrifuge, incubator, autoclave, ovens, torsion balance, cryoscope, refractometer, and sediment pump. Tests samples of products for moisture, oil content, coloring and other characteristics. Tests samples of canned and preserved products to insure compliance with standards. Refers to prepared tables or computes by formula such factors as moisture, salt content, sediment, or

solubility. Compares test results with standards. Records test results. Smells samples of food for odors, or tastes for prescribed flavor. Observes sample smear, sediment disk, or agar sample through microscope to identify bacteria, extraneous matter, or count bacteria colonies. May mix ingredients to make reagents. May operate calculating machine to compute percentages of ingredients in finished product.

**MARINE
SCIENCE**

RESEARCH

These occupations explore, survey, and analyze the physical, chemical, biological, and geophysical aspects of the marine environment. Personnel in this job family are highly trained and may work on shore, underwater, or on the surface.

Physical
Aquatic
Meteorolo
Hydrolo

MINERAL AND CHEMICAL EXTRACTION

These occupations explore, assay, and extract minerals and chemicals from sea water and the ocean floor.

OFF-SHORE DRILLING

These occupations explore, survey, and drill for petroleum and natural gas in open water above the continental shelf from a floating or stationary rig.

Surveyor
Seismogr
Drillers
Roughne
Roustabo
Tool Pus
Derrickm
Floorman
Rig Build
Pumper

FISHING

These occupations locate fisheries and harvest fish and other marine produce. Occupations in this job family vary from unskilled labor to technical skills.

AQUACULTURE

These occupations cultivate marine life in a controlled environment. Personnel in this job family may be employed in a privately owned finfish or shellfish farm or work in a government operated fish hatchery.

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Shellfish
Fish Cult
Fish Hatcher

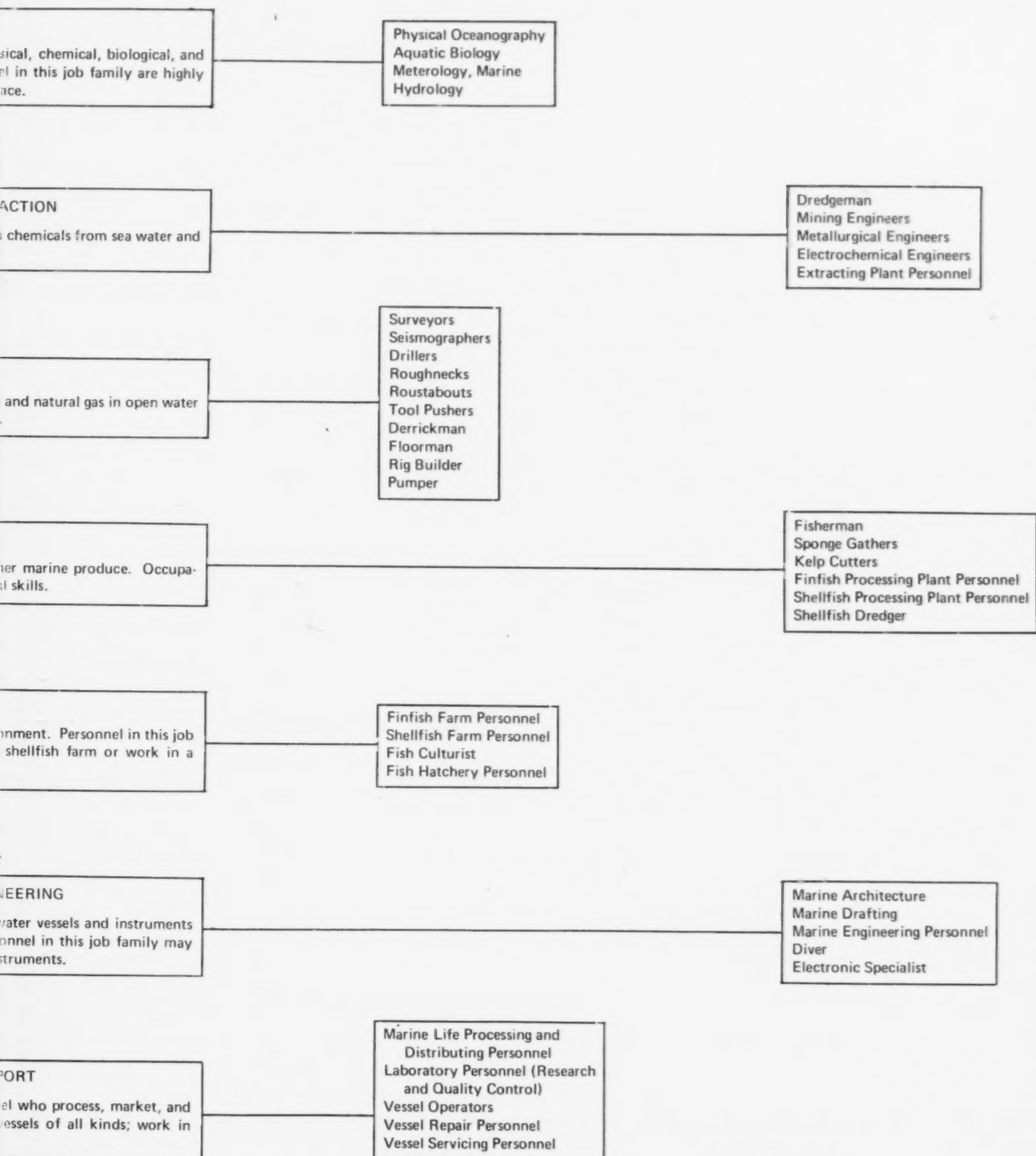
MARINE TECHNOLOGY AND ENGINEERING

These occupations design and construct surface and underwater vessels and instruments used for marine exploration and exploitation. Some personnel in this job family may operate a variety of electronic sensory and data collecting instruments.

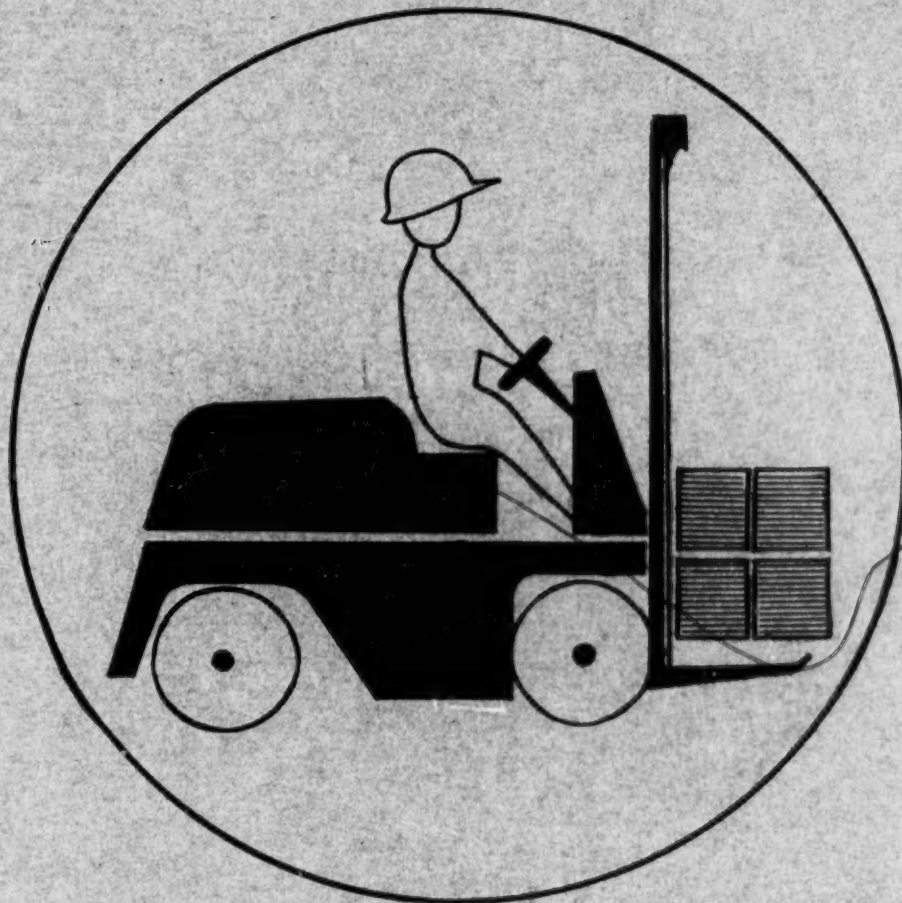
SURFACE AND ON-SHORE SUPPORT

These occupations include a wide range of support personnel who process, market, and distribute marine produce; operate, maintain, and repair vessels of all kinds; work in laboratories or computer centers.

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Vessel Ser



MARKETING AND DISTRIBUTION



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MARKETING AND DISTRIBUTION

I. INTRODUCTION

To a young person seeking a career, two considerations are paramount--the occupational activities he would enjoy performing for most of his adult life and his individual capabilities. A careful choice of a career is the blueprint for a more fulfilling life rather than just the way to make a living.

One of the career fields to be considered is marketing, the system that directs the flow of goods and services from producer to consumer. Marketing activities take place between each of the stages in our economy--at the production, manufacturing, wholesale, retail and consumer levels. It has become so much a part of the American way of life that the present era has been called 'the Age of Marketing.'

Opportunities are almost unlimited in a variety of exciting jobs. Some of the occupations require ingenuity and responsiveness to the changing demands of customers; others offer an outlet for artistic talent or writing ability. Management positions make use of the art of getting along with people and organizing activities; and other jobs involve the performance of physical tasks such as storing and transporting merchandise.

The occupations within the cluster of MARKETING AND DISTRIBUTION have been grouped in seven families: Management, Research, Purchasing, Sales Promotion and Training, Selling, Physical Distribution, and the Related Business Services.

II. METHODOLOGY

In collecting and evaluating information for the purpose of classifying occupations involved in marketing and distribution, the following sources were explored:

A. Libraries

1. Grayson County College Library
2. Austin College Library
3. Denison Public Library
4. Denison Senior High Library

B. Interviews

1. Practitioners involved in marketing, in both manufacturing and retail trade
2. Vocational director for public schools
3. Mid-Management coordinator for college
4. Counselors involved in guidance programs
5. Texas Employment Commission

C. Group discussions with consultants in other areas

A survey of the literature proved very helpful throughout the study. The books and government publications used for reference included:

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- Arnold, Walter M., Editor-in-Chief. Career Opportunities: Marketing, Business and Office Specialists. J. G. Ferguson Publishing Company (Chicago, 1970).
- Elling, Karl A., Introduction to Modern Marketing. The MacMillan Company (New York, 1969).
- Frey, Albert Wesley, Editor, Marketing Handbook, Second Edition. The Ronald Press (New York, 1965).
- Hopke, William E., Editor-in-Chief. Encyclopedia of Careers and Vocational Guidance. Doubleday and Co. (Garden City, New York, 1967).
- Nolan, Carroll A. and Roman F. Warmke, Marketing, Sales Promotion, and Advertising, Seventh Edition. South-Western Publishing Co., (Dallas, 1965).
- Wingate, John and J. Dana Weiner, Retail Merchandising, Sixth Edition, South-Western Publishing Co., (Dallas, 1963).

GOVERNMENT PUBLICATIONS

1970 Census of Population, Classified Index of Industries and Occupations. U. S. Dept. of Commerce, Bureau of the Census (Washington, 1972).

Dictionary of Occupational Titles (Volumes I and II)
Third Edition. U. S. Dept. of Labor (Washington, 1965).

Occupational Outlook Handbook, 1972-73 Edition. U. S. Dept. of Labor, Bureau of Labor Statistics, Bulletin 1700 (Washington, 1972).

Standard Industrial Classification Manual. Executive Office of the President, Office of Management and Budget (Washington, 1972).

Vocational Education and Occupations. U. S. Dept. of Health, Education and Welfare, Office of Education, and U. S. Dept. of Labor, Manpower Administration (Washington, 1969).

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual Job Families, with a listing and discussion of the function of individual occupations, are listed below:

A. MARKETING MANAGEMENT - The success and profitability of a business is to a great extent dependent upon the skillful coordination of all the people and products involved. The activities of management involve planning, organizing, staffing, directing, and controlling men and materials.

A wide variety of management positions are available in the field of marketing and distribution. The more general positions include the activities of determining policies, interpreting data, negotiating contracts and labor agreements, developing skills, and consulting in all areas of marketing.

The specialized management positions are in the areas of sales, advertising, research, distribution, and foreign trade.

The following occupational descriptions would be included in the management area of marketing and distribution.

1. Retail Store Owner - Operates a private business; uses his capital, training, and experience to sell to customers in a particular retail category, may or may not be the manager.
2. Store Manager - (D.O.T. 185.168) - Manages retail business; hires, trains, discharges employees; plans work schedule; supervises pricing, sales promotion, and sales.
3. Supervisor (Foreman, Superintendent) - (D.O.T. 183.168) - Supervises and coordinates activities of workers in a particular department or operation. Studies schedules for job completion, interprets company policies, resolves work problems, motivates workers; in general, directs workers in merchandising activities.
4. Floor Manager -
 - a. Retail - (D.O.T. 299.138) - Manages and coordinates the activities of workers in one department of a store, assigns duties, hears customer complaints, reorders new stock.
 - b. Wholesale - (D.O.T. 223.368) - Allocates floor space at a wholesale auction, determines the quality of the product, directs workers in selling.
5. Merchandising Manager - (D.O.T. 185.168) - Coordinates all merchandising activities for a business firm; formulates policies, determines the necessary percentage of markup to insure a profit, determines the quantity of merchandise to be stocked. Often a senior officer in a company; in charge of all merchandise; may be in a departmental position.
6. Wholesaler - (D.O.T. 185.168) - Manages an enterprise which buys merchandise from manufacturers in large quantities. Authorizes purchase of stock; supervises workers, informs retail customers of new

developments in the market; may direct grading and standardizing of the product.

7. Market Master - (D.O.T. 188.168) - Manages a fruit or vegetable market; leases space, settles differences between buyers and sellers, supervises collection of fees, building maintenance, and other marketing activities.

8. Sales Manager - (D.O.T. 163.118) - Directs sales staffing, training, and performance evaluation; establishes sales goals; advises on promotional activities; analyzes sales statistics to assist management in setting buying policies.

9. Advertising Manager - (D.O.T. 164-118) -

a. Individual company - Plans the advertising policies of a department store, factory or other business, then directs the company's advertising space, inspects and approves all advertising; supervises other employees in department; if agency used, will choose and work with agency.

b. Advertising agency - Directs and is responsible for profitable functioning of an advertising agency. plans, coordinates activities, solicits accounts, contacts media, and supervises personnel.

10. Packaging Director - (D.O.T. 920.132) - Coordinates the activities in packaging products; uses marketing background, technical knowledge, and sales promotion techniques in acting as staff advisor and coordinator in the packaging field; has become an increasingly important position.

11. Training Supervisor - (D.O.T. 166.228) -

a. General - Conducts training sessions in classroom and on-the-job for new employees; plans programs, creates materials, and gives instruction, using lecture, demonstration, and visual aids.

- b. Sales Education Director - Instructs new sales personnel in use and application of the company product, sales techniques and company policies, contributes to the sales manual, and evaluates salesmen.
- 12. Research Director - (D.O.T. 189.118) - Coordinates the activities of assembling and analyzing information needed for effective advertising programs. Studies uses of products and how to reach potential users; directs surveys and the preparation of samples, advertising, and educational materials; compiles statistics.
- 13. Bureau of Standards Supervisor - (D.O.T. 299.138) - Supervises and coordinates the activities of marketing workers, analyzing size, weight, style, quality, and price limitations of products.
- 14. Warehouse Manager - (D.O.T. 929.138) - Directs all warehousing activities; establishes procedures and policies for receiving, handling, and dispensing of warehouse stock, and for maintenance of inventory; hires, trains, and schedules warehouse personnel. See TRANSPORTATION.
- 15. Stock Control Supervisor - (D.O.T. 223.138) - Supervises the activities of clerks in receiving, storing, shipping, and issuing supplies and materials, in taking inventory, in keeping records, and in requisitioning stock.
- 16. Traffic Manager - (D.O.T. 184.168) -
 - a. Industrial - Arranges transportation of products, route carrier, freight classification, and regulations to and from business firms.
 - b. Foreign - Determines the best routes and procedures for movement of cargo, must be familiar with traffic flow, packaging and packing requirements, cargo handling, claims procedures, and booking of freight. See TRANSPORTATION.
- 17. Director of Services (Maintenance) - (D.O.T. 189.168) - In charge of store building directs

building maintenance, upkeep of warehouse, elevator, and related areas; arranges storage of merchandise; liaison with transportation firms for delivery.

18. Export Sales Manager - (D.O.T. 163.118) - Manages the export department of a firm; identifies the foreign markets and their potential for his product; evaluates competition, develops methods of sales follow-up; processes foreign inquiries; prepares offers; manages overseas distribution arrangements.

19. World Trade Manager: Chamber of Commerce - (D.O.T. 187.118) - Develops and utilizes foreign markets; directs activities in the field of domestic trade; analyzes market trends and economic conditions to forecast sales. Assists business firms in expansion or development problems; conducts educational campaigns, stimulates community growth through tourist attractions, conventions, and new industry. See PUBLIC SERVICE.

B. MARKETING RESEARCH AND ANALYSIS - The people working in the research area of marketing face an interesting challenge--that of understanding a particular product or service, finding its sales potential, and forecasting business trends in regard to its future sales. The combined skills of an endless variety of workers is required in order to analyze economic trends, gather information about customer needs, test the product and the packaging, study sales volume, salesman performance, prices, data on new or improved products, advertising effectiveness, and customer reaction.

The occupations included in the research field of marketing fall into four areas which comprise the steps necessary for research and analysis: (1) the collection of data, which includes surveys, interviews, and testing, (2) the tabulation of data, which is of a more statistical or clerical nature, (3) the analysis of the data to interpret the facts and figures into usable form, and (4) the reporting of the findings to management. The occupations described below fall into these four areas.

1. Market Research Analyst - (D.O.T. 050.088) - Conducts a systematic study of market conditions

through surveys, interviews with specialists in various fields, and data available in the field of marketing. Reports and interprets results to management; supervises application on follow-up; Determines potential sales and forecasts trends; may be with independent agency or with company.

2. Marketing Research Worker (Assistant) - (D.O.T. 050.088) - Works with Research Analyst; collects, analyzes, and interprets information. Prepares reports, forecasts sales, selects brand names and package designs, suggests plant locations, advises on transportation, advertising; makes surveys; provides management with data to make decisions.

3. Interviewer or Survey Worker - (D.O.T. 249.262) Interviews the public in homes or by telephone, and compiles statistical information on consumer buying habits or other areas of marketing; reviews, classifies, and sorts questionnaires. Related jobs may be found in CONSUMER AND HOME MAKING EDUCATION.

4. Investigator - (D.O.T. 205.368) - Gathers and dispenses information concerning the various phases of marketing.

5. Statistician - (D.O.T. 020.188) - Plans surveys; collects, organizes, interprets, summarizes and analyzes numerical data on sampling or enumeration bases; applies statistical theory and methods to provide usable information to management. Also see BUSINESS AND OFFICE.

6. Tabulator - (D.O.T. 216.388) - Compiles and tabulates statistics from source materials such as sales records, survey sheets, questionnaires, operates adding machines and calculators; and may verify the authenticity of the material.

7. Statistical Report Writer - (D.O.T. 020.188) - Evaluates the results of surveys and other research; presents data in written form, including charts and graphs.

8. Specialists - Experts in various fields who act as consultants; may be independent or on the staff

of a company.

- a. Economist - (D.O.T. 050.088) - Studies problems in utilization of limited resources of land, materials, and manpower to provide goods and services; studies inflation and depression; provides management with information for decisions on markets, prices, and government control. See PUBLIC SERVICE.
- b. Geographer - (D.O.T. 029.088) - Studies and analyzes land, climate, soil, vegetation, natural resources, surveying, and meteorology. See PUBLIC SERVICE.
- c. Home Economist - Studies consumer needs; may work in test kitchens in the areas of demonstration, development, and advertising. For various fields of Home Economics, see CONSUMER AND HOMEMAKING EDUCATION.
- d. Foreign Trade Consultant - Uses extensive experience to evaluate, advise, and interpret data for organizations in the areas not familiar to employees of the firm.
- e. Scientist (Chemist, Physicist, etc.) - Performs experiments and gives expert information in the various fields of science for the benefit of marketing management.
- f. Psychologist and Sociologist - (D.O.T. 054.088) - Furnishes information on the subject of human behavior as an important aspect of consumer needs and public relations. See PUBLIC SERVICE AND ALSO HEALTH.
- g. Systems Analyst - (D.O.T. 012.168) - Analyzes business problems and programs for computer. See also BUSINESS AND OFFICE.

C. PURCHASING - The objective of the purchasing aspect of marketing may be consumption, production, or resale. Efficient buying is most important to the wholesaler and the retailer because they are unable to change the market or product; they may only choose

among alternatives. The producer and the manufacturer may adapt or change the product, and the consumer may choose not to buy at all.

Purchasing involves identifying needs or wants, finding sources of supply, choosing a source by weighing offers, and negotiating and transferring ownership. Needs may be identified through a requisition, or an automatic re-order point, through research and development of a new idea, because of a recent trend or fashion, or because of necessity. Choosing a source of supply involves a comparison of prices, services, reliability, delivery time, quality, quantity available, and means of transportation.

The occupations listed in this section are typical of the activities involved in purchasing.

1. Buyer or Purchasing Agent - (D.O.T. 162.158) - Studies consumer wants and buying trends in his own specialized area; visits manufacturing showrooms. At re-order point or when requisitioned, orders merchandise, supplies or equipment, comparing quantity, quality, price, discounts, customer appeal, transportation, and delivery dates. Directs recordkeeping, sales, and promotion; supervises and trains assistants; checks on actual shipping and handling; and often authorizes payment.
2. Assistant Buyer - (D.O.T. 162.158) - Aids the Buyer in keeping records, training sales force, reordering merchandise, working with advertising displays, and directing sales promotion staff.
3. Broker - (D.O.T. 162.158) - Negotiates sales, brings the seller and buyer together, furnishes information on market conditions; does not take title or possession of goods as a rule.
4. Jobber - (D.O.T. 185.168) - Also known as a Distributor; purchases products from wholesalers or producers and retails them under a company or his own brand name.
5. Importer - (D.O.T. Imports merchandise from foreign merchants for use or resale; should be fluent in more than one language.

6. Custom-House Broker - (D.O.T. 186.118) - Acts as intermediary between importers, steamship companies, or airlines and the Bureau of Customs by preparing and compiling documents required for foreign trade; provides storage of goods, bonds, and registers ships; must be licensed by the U. S. Government, but is not a government employee.

7. Foreign Clerk - (D.O.T. 219.488) - Computes duties, tariffs, volume, and price conversion of merchandise exported or imported; converts foreign currency; and handles foreign documents. See TRANSPORTATION.

8. Foreign-language Stenographer - (D.O.T. 202.388) - Takes dictation and transcribes material on typewriter to another language. See BUSINESS AND OFFICE.

D. SALES PROMOTION AND TRAINING - Projecting a favorable image of a product paves the way to successful selling. Sales promotion seeks to create a demand for a commodity or a service by informing, persuading, and reminding prospective customers of needs and desires. Promotion of sales includes the coordination of all activities that facilitate profitable selling such as planning or designing the product and package, advertising through printed media, art, television, motion pictures, or radio, displays, demonstrations, and an array of services for the convenience of the customer.

The entire field of sales promotion is considered an important part of contemporary business as a whole. Advertising alone is a major force in our economy.

Training of personnel, the process of developing skills and instilling knowledge of the company and the product, is another interesting aspect of merchandising. Many companies conduct their own in-service training programs with a complete staff to supervise orientation and instruction.

The occupations listed in this section fall within the area of sales promotion and training.

1. Product designer - (D.O.T. 142.081) - Designs

commercial products for utilization, decorative effect, styling, or other customer appeal employed by advertising agencies as well as by producers and manufacturers. See FINE ARTS AND HUMANITIES.

2. Package Designer - (D.O.T. 142.081) - Designs containers for products, considering factors such as convenience, handling, sales promotion, customer appeal, and cost. See FINE ARTS AND HUMANITIES.

3. Fashion Coordinator - (D.O.T. 185.158) - Makes fashion forecasts, studies trends, puts on fashion shows, helps create displays and write copy; is responsible for fashion image. See CONSUMER AND HOME MAKING EDUCATION.

4. Advertising Assistant - (D.O.T. 164.068) - Plans or assists in planning advertising programs to promote sales; consults with company officials and advertising agency; may do layout work, write copy, and prepare displays.

5. Account Executive - (D.O.T. 164.168) - Handles relations between an advertising agency and its client; sells ideas, promotes sales for clients; is employed by a advertising agency or by a private company.

6. Product Manager - Manages the marketing of a single product line for an advertising agency or for a private company; plans all activities related to this particular line.

7. Production Manager - (D.O.T. 141.168) - Directs and works with assistants who convert the copywriters' text and the commercial artists' work into printed form for advertising purposes.

8. Advertising Statistical Clerk - (D.O.T. 216.388) - Compiles records showing the cost and volume of advertising, the amount of merchandise sold, and files copies of advertisements. See BUSINESS AND OFFICE.

9. Display Man (Window Trimmer) - (D.O.T. 298.081) - Plans and executes commercial displays.

applying art, design, selection, and arrangement for the purpose of attracting the attention of customers. See FINE ARTS AND HUMANITIES.

10. Billposter - (D.O.T. 298.887) - Places posters and banners in prominent places to advertise a product or event; displays posters or attaches advertisements on walls and billboards.

11. Sign Writer or Painter - (D.O.T. 970.381) - Designs, lays out and letters signs for advertising displays. See FINE ARTS AND HUMANITIES.

12. Catalogue and Brochure Coordinator - Plans and coordinates all advertising activities for catalogues and brochures distributed to customers.

13. Commercial Artist, Layout Man, Photographer, Designer, Copywriter - See FINE ARTS AND HUMANITIES.

14. Sample Worker - (D.O.T. 223.884) - Prepares articles for use as display samples; assembles, folds, labels, and arranges store samples.

15. Sample Distributor - (D.O.T. 299.887) - Distributes samples of merchandise from house to house, to persons on the street, or to business establishments in order to advertise and promote sales.

16. Demonstrator - (D.O.T. 297.458) - Creates buying interest on the part of the public by demonstrating qualities and functions of merchandise; may or may not actually sell.

17. Model - (D.O.T. 297.868) - Conveys the image of a product as making life better in some way. Wears, uses, or demonstrates the product, sometimes quoting prices; may travel, do clerical work, or actually sell. Different fields include fashion, photographic, or demonstration work.

18. Promotion Character - (D.O.T. 299.848) - Impersonates a storybook character, such as Santa Claus or Mickey Mouse, to promote sales activity in department stores or on the streets; hands out

presents, demonstrates products, and appears in parades.

19. Customer-Service Specialist - (D.O.T. 299.368) - Writes special orders for services and merchandise, performs personal services. Arranges for gift wrapping, prepares special orders, and arranges repairs; notifies customers when service is complete. May act as Bridal Consultant or Personal Shopper.

20. Shopper (Personal or Comparison) - (D.O.T. 296.358) - Visits various stores and salesrooms to gather information on style, quality, or price of merchandise to aid in buying and pricing; suggests products to customers by mail or telephone as a customer service to promote sales; fills orders and arranges for mailing or delivery. See CONSUMER AND HOME MAKING EDUCATION.

21. Bridal Consultant - (D.O.T. 299.358) - Advises prospective brides and party in all phases of wedding planning, such as etiquette, attire, selection of china and silver patterns, and invitations. May arrange for display of gifts and for photographs and conduct rehearsal. See CONSUMER AND HOME MAKING EDUCATION.

22. Public Relations Personnel - See BUSINESS AND OFFICE OCCUPATIONS.

23. Home Service Representative - (D.O.T. 278.258) -- See CONSUMER AND HOME MAKING EDUCATION.

24. Training Representative -- (D.O.T. 166.228) - Prepares and conducts in-service training for company personnel, develops educational materials, compiles data for writing manuals, and conducts specialized courses; tests and evaluates progress.

25. Recruiter - (D.O.T. 166.268) - Maintains contact with sources of talent, explores and interviews candidates, does preliminary screening, and sometimes makes job offers in the course of recruiting salesmen.

26. Teacher - (D.O.T. 090.168) - Gives instruction in the fields of marketing, advertising, salesmanship, and related subjects. See PUBLIC SERVICES.

E. SELLING - Selling is the heart of the marketing function. In fact, the profitable selling of a product or service, is the goal of all the other aspects of business in general. One of every fifteen persons employed in the United States is engaged in some form of selling. An examination of The Dictionary of Occupational Titles reveals hundreds of classifications of salesmen, each with a specialized line.

Every salesworker seeks to interest a prospective customer in a commodity or service. A salesman's background should include a study of the product and the company, the competition, the market, prospective customers, and selling techniques for reaching prospects and securing interviews. Many related jobs are available in the field of selling, some equally important in achieving the firm's objectives.

The occupations listed below are typical of those existing in saleswork. Because of the many classifications of salesmen, they have been grouped into various types of selling operations. For information concerning the sale of specific products and services, see The Dictionary of Occupational Titles.

1. Salesman (Store)

a. Salesman, Commodities - (D.O.T. 260. 270 and 280 series) - Contacts prospects or waits on customers, gives information, quotes prices, uses persuasion, knowledge of product, and training in a particular line of merchandise to sell. Demonstrates the product, helps customer make a selection, writes up sales. May arrange for financing, delivery, installation and service.

b. Salesman, Services - (D.O.T. 250 series) - Uses specialized knowledge of a particular service and persuasion to sell to customers; gives information, quotes prices, writes up sales; may arrange financing.

2. Sales Engineer - (D.O.T. 010.151) - Gives technical presentation, sells, installs, and services an engineering product such as an air conditioning system or machinery.
3. Field Contact Man - (D.O.T. 259.358) - Contacts homeowners, managers, and other prospects to sell goods or services such as television cable service or water softener; may write service agreement and prepare contract.
4. Manufacturer's Representative - (D.O.T. 289.158) - Sells merchandise of one or more manufacturers to wholesalers; calls on customers to solicit orders, demonstrates merchandise, and gives product information; sends orders to manufacturer.
5. Wholesale Field Representative - (D.O.T. 163.158) - Supervises a number of retail outlets for a major company; is responsible for sales, operations, credit, and counseling dealers.
6. Dealer
 - a. Franchised Dealer - Enters into an agreement for exclusive rights to sell a certain product in a definite territory.
 - b. Seconhand Dealer - Sells used merchandise in a store, from house to house, or at auction.
7. Auctioneer - (D.O.T. 294.258) - Sells commodities to the highest bidder at public auction; uses knowledge of specific lines such as furniture, agricultural products, or antiques as well as art of persuasion and public relations.
8. Solicitor - (D.O.T. 293.358) - Calls on prospective customers, selling merchandise or services by telephone or door-to-door; demonstrates products, explains services, takes orders, creates goodwill.
9. Coin-Vending Machine Attendant - (D.O.T. 292.483) - Drives vehicle, refills various types of coin-vending machines, collects and records the amount of money received, and anticipates the needs of customers at various locations.

10. Stamp and Coupon Redemption Clerk - (D.O.T. 290.478) - Shows merchandise, answers questions, brings merchandise from stockroom for customers, checks stamp or coupon books for redemption, records transactions.
11. "Party Saleslady" - (Cooking ware, cosmetics, etc. - Combines social and economic aspects of selling; conducts party, demonstrates product, gives gift to sponsoring hostess, sells to guests.
12. Pawnbroker - (D.O.T. 191.158) - Estimates pawn or pledge value of articles and lends money to customers; examines articles to determine worth, issues pledge ticket, sells unredeemed items.
13. Peddlers - (D.O.T. 291.158 through 291.868) - Sells merchandise, such as ice cream or newspapers, on the street or from door-to-door, using basket, truck or cart to carry the product.
14. Routeman - (D.O.T. 292.358) - Drives a truck, sells, and delivers goods such as bakery, or dairy products, collects money, records sales, prepares lists of anticipated needs of customers, solicits orders. May collect and deliver for a service establishment such as a dry cleaning plant; may be either wholesale or retail, if merchandising business.
15. Sales Clerk - (D.O.T. 290.478) - Shows merchandise, answers questions, sells, wraps, makes charge slips, give change and receipts, handles exchanges and returns.
16. Exporter - (D.O.T. 185.168) - Sells and ships merchandise to foreign merchants and consumers; should be fluent in more than one language.

F. PHYSICAL DISTRIBUTION - The actual dispersing of goods and services from their source to the ultimate consumer involves the efforts of all the individuals who manage and operate the storage facilities such as warehouses; those who handle merchandise in various ways through shipping, receiving, inspecting, and dispatching; and those who actually transport or move goods from one location to another. The field of distribution offers many opportunities for people who prefer more active occupations

involving physical movement combined with skill and knowledge of the job.

Occupations in physical distribution are included in this section.

1. Warehouseman (Stores Laborer) - (D.O.T. 299.887) - Receives, stores, ships, and distributes materials and products. Conveys to the storage area, sorts, inspects, stamps, grades, marks, fills orders, loads materials, and makes repairs.
2. Shipping or Receiving Clerk - (D.O.T. 222.337) - Performs clerical duties in shipping and receiving of merchandise, materials, and products; employed in many types of business and industry. See BUSINES AND OFFICE.
3. Stock Boy - (D.O.T. 223.387) - Controls the flow of goods received, stored, and issued; counts, sorts, and weighs merchandise, fills orders, prepares inventory, requisitions stock, determines method of storage.
4. Material Handler - (D.O.T. 929.887) - Loads and unloads materials, conveys from storage area to vehicle, opens containers, counts and weighs merchandise.
5. Packager
 - a. Hand - (D.O.T. 920.887) - Packages or wraps various products or materials by hand; may assemble cartons, clean containers, sort, label, inspect and insert product into package.
 - b. Machine - (D.O.T. 920.885) - Tends machine that performs packaging functions such as cleaning, filling, sorting, labeling, and weighing products, inspects, makes minor adjustments and repairs; may load conveyor and replenish supplies.
6. Marker - (D.O.T. 209.588) - Prints and attaches price tickets to articles of merchandise, boxes or tickets, or prints price tickets, using machine.
7. Inspector - (D.O.T. 299.687) - Examines, measures, and weighs merchandise and materials; compares and

tests for conformance to specifications or standards.

8. Butcher - (D.O.T. 316.884) - Cuts, trims and prepares meat, poultry, and fish for selling in consumer-size portions, or for cooking in food-serving establishments.

9. Carpet Cutter, Layer, Measurer - see CONSTRUCTION.

10. Drapery Estimator, Hanger, Measurer, and UPHOLSTERER - See CONSUMER AND HOME-MAKING EDUCATION.

11. Warehouse Traffic Man - (D.O.T. 922.137) - Supervises and coordinates activities of workers engaged in loading and unloading vehicles; schedules and dispatches, directs traffic to and from warehouse.

12. Traffic Clerk - (D.O.T. 222.588) - Computes rates, schedules, and costs; prepares reports; records incoming and outgoing freight data such as destination, weight, and route; keeps a file of claims. See BUSINESS AND OFFICE.

13. Delivery Man - (D.O.T. 919.883) - See TRANSPORTATION.

14. Mail Order Filler - (D.O.T. 223.487) - Fills mail orders from customers and marks prices of merchandise on order form; examines order form to ascertain catalog number, size, color, and quantity of merchandise; obtains merchandise from shelves, computes price, and conveys to wrapping area for delivery or mailing.

15. Cashier-Checker - (D.O.T. 299.468) - Accepts money, makes change, gives receipt for payment, keeps records, usually uses cash register; sometimes sells tickets, candy, or other small items.

16. Import-Export Agent - (D.O.T. 184.118) - See TRANSPORTATION.

G. RELATED BUSINESS SERVICES - The related business services in the area of marketing and distribution

are of utmost importance. These include the arrangements for financing merchandise and services, the handling of credit, the insurance coverage, and the many clerical duties which must be performed. These occupations, however, are generally described in another pamphlet in this series. See BUSINESS AND OFFICE.

**MARKETING
AND
DISTRIBUTION**

MARKETING MANAGEMENT

Planning, organizing, staffing, directing, and controlling marketing activities.

General Man
Research
Sales
Promotion a
Distribution
Foreign Trad

MARKET RESEARCH AND ANALYSIS

Collecting, tabulating, analyzing, and reporting marketing information.

PURCHASING

Buying merchandise, materials, or equipment for resale or consumption.

Wholesale Tr
Retail Trade
Foreign Trad

SALES PROMOTION AND TRAINING

Creating a demand for a product or service, stimulating sales, and training sales personnel.

SELLING

Contacting and persuading customers, arranging and completing sales transactions.

Store Selling
Store Selling
Field Repres
Door-to-Door
Exporting
Other Selling

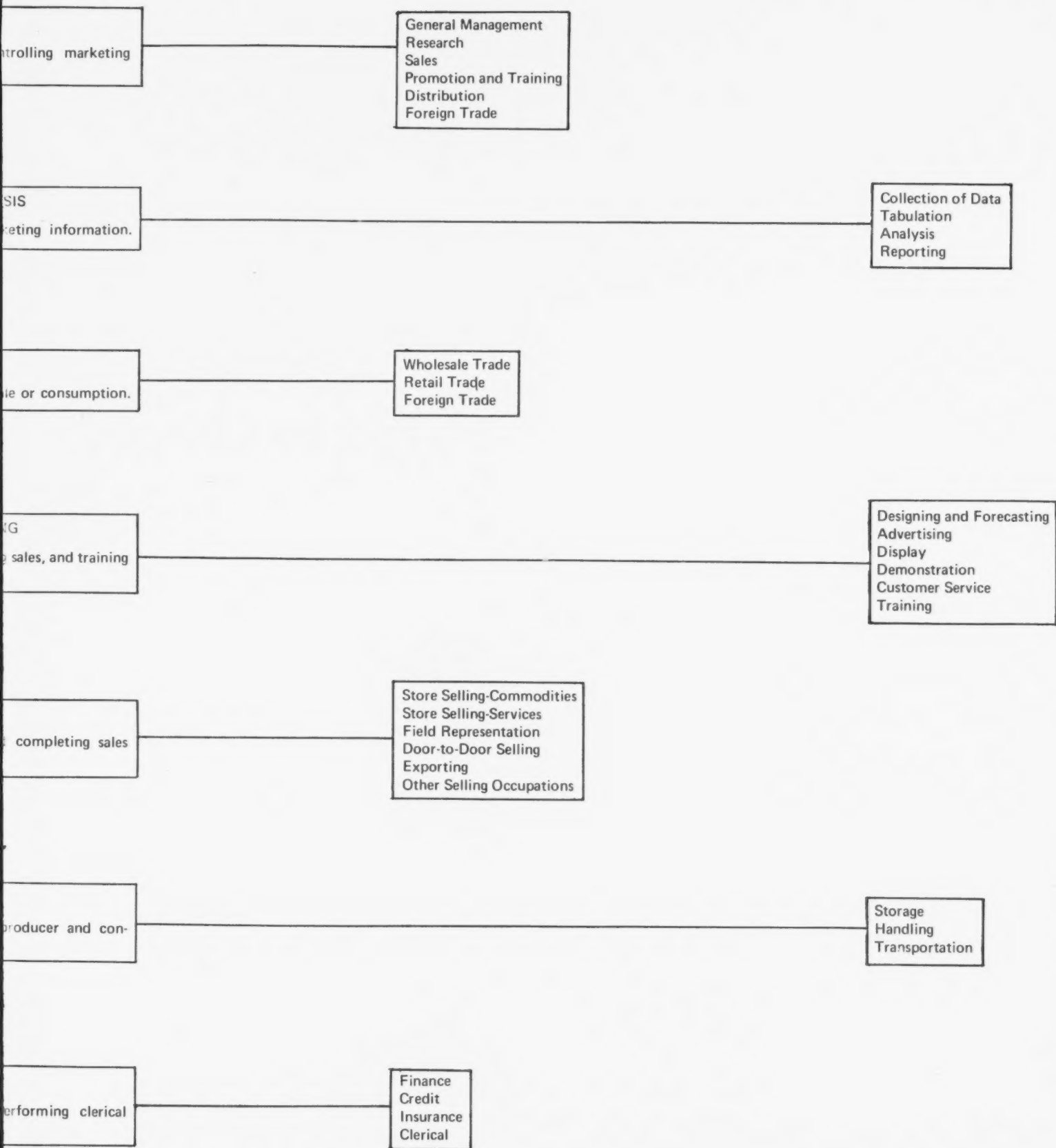
PHYSICAL DISTRIBUTION

Storing, handling, and transporting goods between producer and consumer.

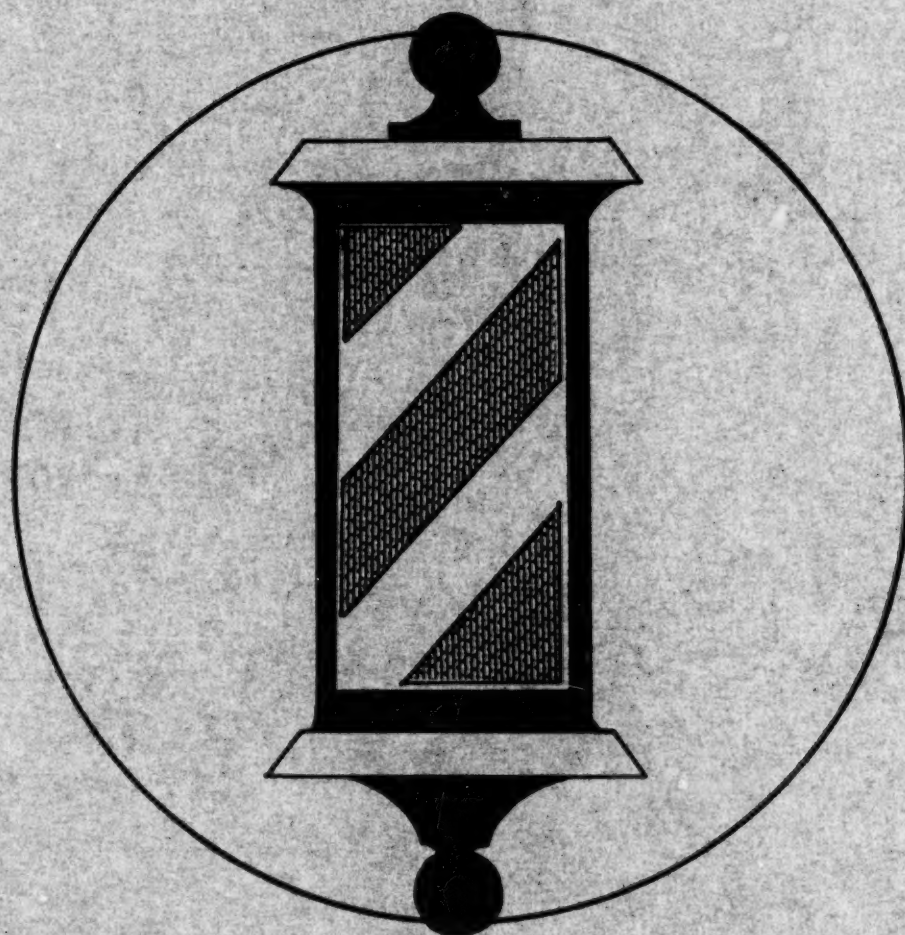
RELATED BUSINESS SERVICES

Arranging credit, financing, and insurance, and performing clerical duties.

Finance
Credit
Insurance
Clerical



PERSONAL SERVICES



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PERSONAL SERVICES

I. INTRODUCTION

The long-term growth in the American economy has created a growing demand for services of all kinds. Thus, in addition to the multitude of goods produced and distributed, a growing share of our nation's wealth and manpower is being devoted to the personal services industries which provide the American citizen with a better and fuller life.

The necessity for extensive person-to-person contact in the performance of many of these service functions tends to limit the impact of technological innovations on employment requirements. Although the adoption of automatic equipment may moderate employment growth in some areas, technological change is not expected to influence greatly or limit the demands in the personal service industries.

Employment in the personal services area is expected to increase very rapidly through the 1970's. Major factors contributing to the sharp growth in the demand for these services are expected to stem from population growth, rising personal incomes, and an expanded interest in personal and family comforts. So, in today's job market, the service industries represent an important source of employment to new as well as experienced workers, and offer job opportunities to both women and men with various levels of skill and differing degrees of training and education.

The cluster of personal service occupations is generally concerned with personal improvements, the care of a person, his apparel or possessions, and his physical appearance. It is typified by the seven major families found within the framework of the cluster. Specifically these are:

- A. Domestic Services
- B. Lodging and Related Services
- C. Barbering, Cosmetology and Related Services

- D. Drycleaning, Laundry, and Apparel Services
- E. Stewards, Attendants, and Miscellaneous Services
- F. Domestic Animal Care
- G. Food and Beverage Preparation Service

II. METHODOLOGY

The information included within this cluster is the product of several research approaches which were used specifically to gather and assemble facts about personal services.

An attempt was first made to coordinate the cluster with the others found in this publication by a series of conferences, both individual and group, with the other consultants involved. Literature was then surveyed which included the following: The Occupational Outlook Handbook published by the Bureau of Labor Statistics, U.S. Department of Labor; The Directory of Occupational Titles, Vol. I and II published by the Manpower Administration, Department of Labor; a printed cross-reference of D.O.T. and U.S. Office of Education job title classifications and other materials.

Additional insight was provided by interviews with the local Texas Employment Commission personnel and a private employment agency.

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual Job Families, with a listing and discussion of the function of individual occupations, are listed below:

A. DOMESTIC SERVICE - The following designations cover occupations in or about private homes concerned with the rendering of services for members of the household or their guests. Specific duties (job classifications) considered are:

1. Day Workers - (D.O.T. 301.887) - Occupations concerned with performing duties in a private home such as cleaning, making beds, caring for children and cooking. Employment is by the day and work may be for several employers.
2. Laundress - (D.O.T. 302.887) - Occupations concerned with washing and ironing clothes and household linens for one or several families.
3. Housekeeper - (D.O.T. 303.138) - Occupations concerned with

performing the more laborious household tasks such as washing walls, windows, and shifting furniture. Similar acts are performed by Farm Housekeeper and Farm Housemaid - (D.O.T. 303.878).

4. Yardman - (D.O.T. 304.887) - A Gardener, Job Man or Utility Man employed to keep yard or grounds in orderly condition.

5. Cook - (D.O.T. 313;314;315) - This group includes occupations concerned with planning menus, estimating consumptions, and/or cooking foods in private homes, restaurants, and hotels. Workers usually specialize in a particular area such as : Chef - (D.O.T. 313.131); Baker - (D.O.T. 313.781); Short Order Cook - (D.O.T. 314.381); and Specialty Cooks - (D.O.T. 314.781).

6. Maids, Domestic - (D.O.T. 306.878) - These occupations are concerned with performing a variety of domestic tasks, such as cleaning, dusting, making beds, caring for children, washing, ironing and cooking. May be asked to perform a combination of duties in keeping private home clean and orderly, in cooking and serving meals, and in rendering personal services to family members. When employed in motherless home, may be designated Housekeeper, Working - (D.O.T. 306.878). When employed to take charge of home because of illness or for working mother, may be designated Home-maker - (D.O.T. 306.878).

7. Nursemaid - (D.O.T. 307.878) - This occupation concerns caring for children. Included are such activities as dressing, feeding, bathing, overseeing play, keeping clothes in good repair, observing and monitoring play activities, and keeping children's quarters clean and tidy. This occupation may be designated as Nurse, Infants' - (D.O.T. 307.878); or when employed on a daily or hourly basis, may be designated as Baby Sitter - (D.O.T. 307.878).

8. Butler - (D.O.T. 309.138) - A butler may supervise and coordinate activities of household employees engaged in cooking, cleaning, and related domestic duties, mix and serve cocktails, answer telephone and deliver messages, and announce guests. In some cases he may employ and discharge other household employees, fixing their salary from funds received from employers.

9. Valet - (D.O.T. 309.878) - A valet attends to his employer's personal wants, performing a variety of services such as tending to clothing, mixing and serving drinks, answering telephone and running errands, shaving or massaging employer, and driving his employer's car. He may be referred to as Gentleman's Man, Manservant or Man's Mar.

10. Domestic Couple - (D.O.T. 309.999) - A man and woman, usually husband and wife, who perform all domestic work in a household. The man performs duties such as driving car, gardening, and acting as butler. The woman performs various cooking, cleaning, washing and ironing, and maid duties.

11. Man-of-All Work - (D.O.T. 304.887) - A Handyman, Odd-Job Man, or Utility Man who performs any combination of duties in keeping a private home clean and in good condition. He may clean furniture, wash windows, paint and repair, mow and rake lawns, groom and exercise pets, etc. When duties are confined to upkeep of house, may be designated Housekeeper, or when employed on year-round basis, may be designated Caretaker.

12. Baby Sitter - See Nursemaid, this pamphlet.

13. Chauffeur - (D.O.T. 359.873) - A chauffeur drives an automobile as ordered by owner or other passenger and performs other miscellaneous duties such as keeping car clean, making minor repairs, and assisting passengers to enter and leave car.

B. LODGING AND RELATED SERVICE OCCUPATIONS - The following designations cover occupations which provide general services or accommodations to persons in private homes, boarding houses, hotels and motels and other similar establishments. Basically the group includes housekeepers, maids, porters, attendants, maintenance people and other service oriented personnel. Specific duties (job classifications) considered are:

1. Manager, Boarding House - (D.O.T. 320.138) - The manager supervises and coordinates activities of workers in a boarding house engaged in providing meals and lodging accommodations for transient and permanent guests. He may advertise vacancies, show and rent rooms, plan meals, purchase supplies, collect rent and pay bills, participate in cleaning and cooking activities and make minor repairs to building and furnishings.

2. Manager, Lodging Facilities - (D.O.T. 320.137) - This person manages and maintains temporary or permanent lodging facilities, such as small apartment houses, motels, small hotels, and trailer parks. His duties are very similar to the Boarding House Manager. (See above.) In addition, he may provide daily maid service in overnight accommodations, rent equipment such as rowboats, water skis, and fishing tackle, and sell light lunches, candy, tobacco, and other sundry items.

3. Housekeeper, Hotel and Institutions - (D.O.T. 320.138) - The housekeeper supervises work activities of cleaning personnel to

insure clean, orderly, attractive rooms in hotels, hospitals, and similar establishments. He may assign duties to workers, inventory stock, investigate complaints, make recommendations to management, train new employees, and recommend dismissals.

4. Housekeeper, Home - (D.O.T. 303.138) - This housekeeper supervises and coordinates activities of household employees in a private residence. He may cook and serve meals, clean, wash and iron, order foodstuffs and cleaning supplies, keep records of expenditures and hire or discharge other household employees.

5. Maid - (D.O.T. 306.878) - This person has various duties in keeping the private home clean and orderly, cooking and serving meals and rendering personal services to family members. She may plan meals and purchase foodstuffs and household supplies, oversee activities of children, clean house and perform additional duties such as answering telephone and doorbell and feeding pets.

6. Houseman - (D.O.T. 323.887) - The house man may be called Hall Boy, Houseboy, House Cleaner, Mover, Set-Up Man or Utility Man. He may perform many combinations of tasks to maintain premises in a clean and orderly manner. Specific duties usually include heavier jobs of cleaning, polishing and moving.

7. House Mother - (D.O.T. 187.138) - The house mother acts as house manager, adviser, and chaperon for boarding school, college fraternity or sorority house, children's home, or similar establishment. She may be responsible for hiring housekeeping personnel, ordering supplies, assigning rooms, assisting in planning recreational activities, answering the telephone, distributing mail and escorting individuals on trips outside the establishment.

8. Bellboy - (D.O.T. 324.878) - A bellboy serves hotel guests by performing tasks such as escorting incoming guests to their rooms, assisting them with hand luggage, explaining features of the room, offering information pertaining to available services and facilities, delivering messages, and operating the elevator.

9. Baggage Porter - (D.O.T. 324.878) - The baggage porter delivers luggage to and from hotel rooms, transfers trunks, packages and other baggage to room or loading area, arranges for outgoing freight, supplies travel information, transportation rates and schedules and generally cares for the patron's luggage.

10. Doorman - (D.O.T. 324.878) - A doorman serves residents, guests or patrons of hotels, stores, or similar establishments by

opening doors, hailing taxicabs, answering inquiries, assisting the elderly or infirm into automobiles, and performing similar tasks. He may also prevent entrance of unauthorized or undesirable persons and may forcibly eject inebriated or rowdy persons from the premises.

11. Room-Service Clerk - (D.O.T. 324.878) - This person may be called Delivery-Room Clerk, Package Boy, Package Clerk, Receiving-Room Clerk, or Runner. He may perform any combination of tasks related to serving guests in apartments, motels or hotels. His specific duties may include mail delivery, delivery and removal of articles from guests' rooms, arranging for pressing clothes and shining shoes, and maintaining valet service.

12. Service Superintendent - (D.O.T. 329.138) - This person may be known as Service Manager, Service Supervisor or House Superintendent. This person will supervise and coordinate activities of workers engaged in handling baggage, operating elevators and cleaning public areas of the establishment. He may also hire workers, make assignments, adjust guests' complaints regarding service personnel and conduct investigations for lost baggage.

13. Elevator Operator - (D.O.T. 388.868) - The elevator operator will operate an elevator to transport passengers between floors of office buildings, apartment houses, department stores, hotels, or similar establishments. In addition to running the elevator, he may supply information to passengers, distribute mail to various floors, answer the telephone, prevent unauthorized persons from entering the building and assist other employees to load and unload freight.

14. Exterminator - (D.O.T. 389.884) - See ENVIRONMENT.

15. Maintenance Foreman - (D.O.T. 89.138) - This occupation may carry the title Building and Grounds Foreman, Building Foreman, Building Maintenance Supervisor, Group Supervisor of Maintenance, or Mechanical Foreman. This is a supervisory position which is responsible for the coordination of activities of workers engaged in all phases of keeping buildings and grounds in clean and orderly condition and in maintaining and repairing utility systems and physical structures.

16. Janitor - (D.O.T. 382.884) - The janitor may keep a hotel, office building, apartment house, or similar building in clean and orderly condition. He may sweep, mop, empty garbage containers, perform routine painting, plumbing, electrical wiring, and other related activities while using hand tools. He may also mow lawns, trim shrubbery, clean snow and debris from sidewalks, and notify management concerning need for major building repairs.

17. Charwoman - (D.O.T. 381.887) - Other descriptions of this occupation may include Cleaning Girl, Cleaning Maid, Cleaning Woman, Clean-Up Girl, Clean-Up Woman, Dust Woman, Janitress, Maid, Matron, Portress, Scrub Girl, and Scrub Woman. Specific duties may be to keep the premises of commercial establishment, office building, or apartment house in clean and orderly condition, performing any acts necessary. She may mop, sweep, dust, clean, polish, wax, or vacuum as needed. She frequently works in evenings after day-time employees have left the premises.

18. Porter - (D.O.T. 381.887) - Other descriptions of this occupation may include Clean-Up Man, Housekeeper, House Officer, Janitor, Building Maintenance, Sanitary Man, or Sweeper. He keeps the premises of commercial establishments, office buildings, or apartment house in clean and orderly condition. In doing this he may dust, sweep, mop, or do other such tasks. He may work in establishments such as banks, insurance companies, places of amusement, beauty parlors, dental labs, or stores.

19. Resort Couple - (D.O.T. 329.999) - A man and woman, usually husband and wife, who perform maintenance and service activities at a resort. The man cleans and maintains the grounds and beach, repairs and paints cabins, boats, and recreational facilities and performs related tasks. The woman registers guests, cleans cabins, issues linens and cooking equipment, and collects rentals.

20. Lodging Facility Couple - (D.O.T. 329.999) - A man and woman, usually husband and wife, who maintain, clean and make repairs to lodging facilities, such as small apartment houses, hotels, motels, trailer parks, tourist camps, or vacation resorts. The male performs heavier duties such as scrubbing floors. The female cleans and arranges for other household services. Either person shows and rents accommodations, advertises vacancies, collects rentals, gives information, and adjusts complaints of occupants.

21. Camp Attendant - (D.O.T. 359.887) - This attendant performs various duties about a logging, mining, construction, or other camp, such as disposing of garbage, keeping camp area clean, sweeping and tidying sleeping quarters and making beds, carrying water to camp and cutting firewood.

22. Receiving-Room Clerk - (D.O.T. 329.478) - This clerk receives and delivers or forwards packages, baggage, freight, or other items for hotel guests. He accepts packages, baggage, and other articles for hotel guests from deliverymen and keeps records of items received. In addition to this type of work he may arrange for cleaning, laundering, and repair of guest's clothing and other items. He then would compute

the charge slips for the services rendered to guests and forward them to the bookkeeping department.

23. Lodging Facilities Attendant - (D.O.T. 329.878) - This attendant may be known as an Auto-Camp Attendant, Resort Caretaker, or Tourist-Camp Attendant. He performs various clerical, housekeeping, and maintenance duties at a tourist camp, motel, trailer park, vacation resort, or lodge. In addition, he may give information to guests concerning services and facilities, register guests, assign cabins, collect rent, issue supplies, maintain outside recreational areas, and perform other general cleaning and maintenance duties.

C. BARBERING, COSMETOLOGY AND RELATED SERVICES - The following designations cover occupations concerned with rendering beauty and/or other related treatments to the human body. Included are areas of service such as hair grooming, weight reducing, make-up, and embalming. Specific duties (job classifications) considered are:

1. Barber - (D.O.T. 330.371) - This occupation is concerned with cutting and shaping hair and mustaches, shaving whiskers and/or trimming beards, giving facial massages, shampoos, and scalp treatment. Barbers may also fit hair pieces.

2. Manicurist - (D.O.T. 331.878) - This occupation is concerned with cleaning, shaping, and polishing fingernails, rubbing lotions on hands and/or massaging them.

3. Hair Stylist - (D.O.T. 332.271) - This person specializes in dressing hair according to latest style, period, or customer preference. The stylist studies the facial features of the patron and arranges, shapes, and trims hair to achieve desired effect, using fingers, combs, barber scissors, hair-waving solutions, hairpins, and other accessories as required. New styles may be created especially for the patron.

4. Cosmetologist - (D.O.T. 332.271) - The cosmetologist may be referred to as a Beautician, Beauty Culturist, Beauty Operator, or Cosmetician. The cosmetologist suggests coiffures according to physical features of patron, styles hair, applies bleach, dye or tint, and suggests cosmetics for conditions such as dry or oily skin. He may also perform other beauty services such as massaging face or neck, shaping and coloring eyebrows or eyelashes, removing unwanted hair, and applying solutions that straighten hair or retain curls or waves. He may be designated according to beauty service provided as Facial Operator, Finger Waver, Hair Tinter, Marceller, Permanent Waver or Shampooer.

5. Wig Dresser - (D.O.T. 332.38) - This occupation is concerned with dressing wigs and hair pieces according to instructions, samples, sketches, or photographs. The wig dresser combs and sets hair using barber and beautician equipment.
6. Makeup Man - (D.O.T. 333.271) - See FINE ARTS.
7. Masseurs - (D.O.T. 334.878) - This person may be called Bath Attendant, Bath-House Attendant, Bathman, or Rubber. Masseurs' duties include massaging customers and administering other body conditioning treatments for hygienic or remedial purposes. Basic duties include massaging body, administering steam or dry heat, directing clients in activities such as reducing or remedial exercises. Feminine title: Masseuse.
8. Reducing-Salon Attendant - (D.O.T. 334.878) - The attendant performs duties in reducing salons such as spreading paper mats or sheets on table, assisting customers onto table for massaging treatment, turning dial knob on table equipped with automatic timer to start vibrating action, repositioning customer after each treatment and repeating procedure until treatment is completed.
9. Bath Attendants - (D.O.T. 335.878) - These occupations are concerned with assisting clients of public bath houses to take Russian, Sauna, Turkish, electric cabinet, sweatbox, or steam baths, providing and stocking towels, and checking money and valuables.
10. Cooling-Room Attendant - (D.O.T. 335.878) - These occupations are concerned with attending to the comforts and needs of thermal bath customers cooling off and resting after bath and massage. Other duties may include procuring beverage, food, or other items on request, arranging for valet services, changing bedding on cots, shining shoes, and performing janitorial duties in the cooling room area. He may be called Alcohol Rubber or Slumber-Room Attendant.
11. Hot-Room Attendant - (D.O.T. 335.878) - This attendant serves customers in dry-heat cabinet or room or steamroom of athletic bathing or other establishments. He is in charge of operating procedures in the hot-room, and may be designated according to bath facility served as Dry-Heat Cabinet Attendant, Dry-Heat-Room Attendant, Shower Attendant, or Steam-Room Attendant.
12. Embalmer - (D.O.T. 338.38) - The embalmer prepares bodies for interment in conformity with legal requirements, reshapes or reconstructs disfigured or maimed bodies using such material as clay, cotton, plaster of paris and wax, applies cosmetics to impart lifelike

appearance, dresses body and places body in casket. Other duties may include arranging funeral details, maintaining records, and supplying services to the family of person being embalmed.

13. Cremator - (D.O.T. 359.885) - The cremator tends retort furnace that cremates human bodies, places rings and jewelry in temporary box for return to relatives, places remains in container, cleans building and fixtures, and may care for lawn and shrubs.

14. Funeral Attendant - (D.O.T. 359.878) - The funeral attendant performs a variety of tasks during a funeral. Specific tasks include placing casket in parlor or chapel prior to wake or funeral service, arranging floral offerings and lights around casket, directing and escorting mourners, issuing and storing funeral equipment, and in some cases carrying the casket. Other names may be Deskman, Doorman, Undertaker, or Usher.

15. Scalp-Treatment Operator - (D.O.T. 339.371) - The scalp-treatment operator gives hair and scalp conditioning treatments for hygienic or remedial purposes. He massages, shampoos, and steams hair and scalp of patron to clean and remove excess oil using liquid soap, rinses and hot towels. Other duties include administering remedial treatments to relieve such conditions as falling hair, diseased or itching scalp, using such therapeutic equipment as infrared or ultra-violet lamps, and maintaining treatment records. He may also be considered a Hair-and-Scalp Specialist, Scalp Specialist, or Trichologist.

16. Tattoo Artist - (D.O.T. 339.868) - The tattoo artist pricks the skin of the patron, using a needled electric tool that inserts indelible pigment into the skin to form a decorative or ornamental design. He mixes color pigments, adjusts and repairs his tools and may draw original designs for tattoo work. Other names for this occupation include Jagger, Tattooer, and Tattoobist.

17. Reducing-Machine-Operator - (D.O.T. 339.878) - This person applies muscle vibrating machine to portions of customer's anatomy, assists patron to disrobe and dress, starts and stops vibrating machine, and rubs treated area with special preparation to refresh skin.

18. Electrologist - (D.O.T. 339.371) - The electrologist removes hair or blemishes from skin of patron by electrolysis. He may be considered an Electric-Needle Specialist or Electrolysis Operator.

D. DRYCLEANING, LAUNDRY, AND APPAREL SERVICES - The following designations cover occupations concerned with improving the appearance of

and repairing such items as clothing, furnishings, and accessories. Included are areas of service in laundering, drycleaning, shoe and luggage repair, and related occupations. Specific duties (job classifications) included are:

1. Laundering Occupations - This group of jobs is concerned with washing, drying, and mending garments and household furnishings, such as blankets, curtains, and washable rugs, in commercial laundries. Included are acts of sorting soiled articles, examining laundered articles, examining laundered articles for spots, tears, stains, wrinkles, and other defects, and folding laundered articles.

a. Laundry Foreman - (D.O.T. 361.138) - The foreman supervises and coordinates the activities of workers engaged in receiving, marking, washing, and ironing clothes or linens. He may be designated according to the activity supervised as Flatwork Foreman, Laundry-Marker Supervisor, Receiving, Marking and Washing Foreman, Shirt-Ironer Supervisor, Sorting and Folding Supervisor, or Washroom Foreman.

b. Ticket Girl - (D.O.T. 361.448) - The ticket girl computes the cost of customer's laundry by pricing each item on customer's list, using adding machine, calculating machine, or comptometer. She may keep inventory and prepare statements.

c. Flatwork Tier - (D.O.T. 361.587) - This person folds, stacks, and wraps ironed flatwork. He then writes customers' names on the bundles and places them in the storage bin for customer pick up.

d. Assembler, Wet Wash - (D.O.T. 361.687) - This worker re-assembles washed laundry according to lot number of individual customer's bundles preparatory to subsequent processing such as tumbling, starching, or ironing.

e. Classifier - (D.O.T. 361.687) - This worker sorts incoming laundry into lots, such as flatwork, starchwork, and colored articles prior to washing.

f. Rug Cleaner, Machine - (D.O.T. 361.782) - This worker operates a machine which soaps, scrubs, rinses, and partially dries rugs and carpets in the laundry plant. He usually works on smaller rugs because of limited space in the machine.

g. Laundryman, Hand - (D.O.T. 361.884) - This person washes, dries, and irons articles in hand-laundries and laundromats,

using equipment such as hand irons and small washing and drying machines.

h. Carding Machine Operator - (D.O.T. 361.885) - This operator tends a carding machine which brushes and raises the nap on blankets.

i. Laundryman - (D.O.T. 361.885) - The laundryman tends a laundering machine which cleans articles such as rags, wiping cloths, filter cloths, bags, sacks, and work clothing.

j. Laundry Operator - (D.O.T. 369.884) - This person receives, marks, washes, finishes, checks, and wraps articles in a small laundry. He performs any combination of tasks in the laundry.

k. Washer, Machine - (D.O.T. 361.885) - The washer tends one or more machines that wash commercial, industrial, or household articles such as garments, blankets, curtains, draperies, fine linens, and rags.

l. Laundry Laborer - (D.O.T. 361.887) - This worker prepares laundry for processing and distributes laundry, performing any combination of duties in the laundry.

m. Washer, Hand - (D.O.T. 361.887) - This worker washes articles such as curtains, table linens, and lingerie by hand.

2. Dry Cleaning Occupations - This group includes occupations concerned with washing garments, furs, hats, rugs, and other household furnishings with cleaning solvents. This operation may include washing unusually soiled articles with water which may or may not be preparatory to washing them with solvents.

a. Spotter - (D.O.T. 362.387) - The spotter identifies stains in wool, synthetic, and silk garments and household fabrics, and applies chemical solutions to remove them, determining spotting procedures on the basis of type of fabric and nature of stain.

b. Dry Cleaner - (D.O.T. 362.782) - The dry cleaner operates drycleaning machines to clean garments, drapes, and other materials that cannot be washed in water without shrinkage or damage to the fabrics, utilizing knowledge of cleaning processes, fabrics, and colors to determine procedures.

c. Dry Cleaner, Hand - (D.O.T. 362.884) - This person cleans

by hand articles such as garments, drapes, lampshades, and leather goods that require individual treatment or are too delicate for machine cleaning.

3. Pressing Occupations - This group includes occupations concerned with removing wrinkles from and restoring shape or giving finish to cloth articles by the application of tension or pressure in commercial laundries, drycleaning plants, and valet shops. The pressure method is usually accompanied by heat or steam.

a. Silk Finisher - (D.O.T. 363.781) - This presser works with drycleaned and wetcleaned silk and synthetic fiber garments, using hot-head press or steamtable, puff irons and hand irons. In establishments where many silk finishers are employed, they may be designated according to speciality such as Tie Presser, etc.

b. All-Around Presser - (D.O.T. 363.782) - This person operates a steam pressing machine or uses a hand iron to press garments such as trousers, sweaters, and dresses, usually in a small cleaning establishment.

c. Presser, Machine - (D.O.T. 363.782) - This person operates a machine to smooth surfaces, flatten seams, or shape articles such as garments, drapes, slipcovers, and hose in manufacturing or drycleaning establishments. He may be designated according to the article pressed as Coat Presser, Pants Presser, etc.

d. Blocker - (D.O.T. 363.884) - The blocker blocks (shapes) knitted garments after cleaning. He shrinks or stretches garments by hand until they conform to original measurements and pins garments to cover of steamtable. He then applies steam until garment is reshaped.

e. Hand Presser - (D.O.T. 363.884) - This presser uses a hand iron and presses articles such as drapes, knit goods, millinery parts, parachutes, garments, and slip covers or delicate textiles such as lace, rayons, and silks. This class of pressing requires dexterity with hand iron to press intricate parts of articles. He may be designated according to article or part pressed such as Coat Ironer, Lining Presser, or Vest Presser.

f. Flatwork Finisher - (D.O.T. 363.886) - This person presses flatwork such as household linens, sheets, pillowcases, tablecloths, and napkins. This type of pressing is done by placing the item on a feeding roller that conveys it into a pressing machine. His title may be designated according to the specific

act performed such as Flatwork Catcher, Flatwork Feeder, Flatwork Folder, or Flatwork Shaker.

4. Apparel Services - This group of occupations is concerned with the appearance of personal apparel. Included will be jobs which involve dyeing, repairing, reweaving, or altering materials.

a. Shoe Dyer - (D.O.T. 364.884) - This person dyes or tints shoes for customers of shoe repair or shoe shining shops. He selects prepared dyes or mixes dyes to match shades specified by instructions or color chart, applies dye, and polishes the shoes.

b. Shoe Repairman - (D.O.T. 365.38) - This repairman repairs or refinishes shoes, following customer specifications, or according to nature of damage, or type of shoe. He may also repair belts, luggage, purses, and other products made of materials such as canvas, leather, and plastic. Other duties include quoting charges, receiving articles, and collecting payment for repairs.

c. Hatter - (D.O.T. 369.884) - The hatter cleans, blocks, trims, and makes minor repairs to all types of men's and women's hats to give them a clean, new appearance. The hatter's classifications are made according to the operation performed such as Hand Blocker, Fur Blower Operator, Hat-Blocking Machine Operator, and Hat Finisher.

d. Reweaver - (D.O.T. 782.781) - This person weaves threads or patches into fabric articles to repair holes, tears, or worn places using weaver's hand needles. He may press the articles using a steam iron or damp cloth and dry iron.

e. Bootblack - (D.O.T. 366.878) - The bootblack cleans and polishes footwear for customers. He may also brush lint from patron's clothing using a whiskbroom, assist customers with wraps, sweep and mop floors, dust and polish furniture, and wash windows in the establishment.

f. Laundrette Attendant - (D.O.T. 369.877) - This attendant assists customers to launder or dry clean clothes using self-service equipment. He may in some cases perform all the services for the customer. He may also sell cleaning agents, collect for services and materials, and unload machines.

g. Tailor - (D.O.T. 785.261) - A tailor designs and makes

tailored garments such as suits, topcoats, overcoats, and other dress clothing, applying principles of garment design, construction and styling. He may specialize in making garments and be designated accordingly, such as Coat Tailor.

h. Dressmaker - (D.O.T. 785.361) - The dressmaker makes women's garments such as dresses, coats, and suits according to customer specifications and measurements. This may be done by standard patterns according to measurements of customer, and adapting patterns to obtain specified style, or making the garment according to pictures furnished by customer.

i. Furniture Cleaner - (D.O.T. 362.884) - This person cleans furniture in plants or on customers' premises, using brush, sponge, drycleaning fluids, or detergents to remove spots, stains, dust, and dirt.

j. Rug Cleaner - (D.O.T. 369.884) - This person cleans rugs with chemical solutions in plants or on customers' premises. This process is usually done by machines that soap, scrub, rinse, and partially dry rugs or carpets.

E. STEWARDS, ATTENDANTS, HOSTS, AND MISCELLANEOUS PERSONAL SERVICES - The following designations cover a wide range of occupations concerned with greeting, serving, guiding and otherwise attending to the specific wishes of customers. Included in the area are services such as escorting, chauffeuring, and hosting. Specific duties (job classifications) considered are:

1. Chaperon - (D.O.T. 359.868) - A person who accompanies minors on trips to educational or recreational establishments or other functions such as dances, concerts, and sports events. Other duties include following parents' instructions regarding minors' activities, imposing limitations and restrictions to insure their safety, well-being, and conformance to designated behavioral standards, planning free-time activities and arranging for transportation, tickets and meals.

2. Escort - (D.O.T. 359.868) - An escort acts as social partner for person of opposite sex to enable individual to attend functions, participate in activities requiring a partner, or provide companionship or protection while visiting public establishments, such as restaurants, night clubs, theaters, and gambling houses. Other duties may be to suggest places of entertainment, arrange for transportation and tickets, and accompany individual on sightseeing tour. This person may be considered a Guide Escort.

3. Chauffeur - (D.O.T. 913.883) - A chauffeur drives a private car as ordered by owner or other passenger and performs other miscellaneous duties such as assisting passengers, keeping car clean, polished and in operating condition, and making minor repairs. He may be called a Driver.
4. Blind-Aid - (D.O.T. 359.878) - This person may be called Blind-man Attendant, Clerk Guide, or Blind Escort. His specific duties include assisting blind persons, driving motor vehicles to transport blind persons to specified locations according to their personal and business activities, carrying brief or sample cases, preparing and maintaining records, and typing correspondence and reports.
5. Child-Care Attendant - (D.O.T. 355.878) - This person attends to personal needs of handicapped children while in school to receive specialized academic and physical training. He may help children to walk, board buses, put on braces, eat, dress, and perform other physical activities as their needs require.
6. Kindergartner - (D.O.T. 359.878) - The kindergartner entertains children in nurseries maintained by department stores, country clubs, churches, or similar establishments as services to patrons, by reading aloud, organizing and participating in games, and giving elementary lessons in arts and crafts. Also see PUBLIC SERVICES.
7. Porter - (D.O.T. 357.878) - See TRANSPORTATION.
8. Porter, (Janitor) - (D.O.T. 381.887) - A porter keeps the premises of commercial establishments, office buildings, or apartment houses in clean and orderly condition. This type of work may be done in banks, places of amusement, beauty parlors, public baths, dental laboratories, stores or repair shops. He may be called Clean-Up Man, Housekeeper, House Officer, Janitor, Laborer, Building Maintainer, Sanitary Man, or Sweeper.
9. Baggageman or Baggage Porter - (D.O.T. 358.878 and 324.878) - A baggageman may be engaged in handling baggage in hotels or motels, transferring baggage from room to room, arranging for incoming and outgoing freight, preparing and attaching claim checks, and supplying guests with various services as needed.
10. Checkroom Attendant - (D.O.T. 358.878) - This attendant stores wearing apparel, luggage, bundles, and other articles for patrons of an establishment or employees of business establishment, issuing claimcheck for articles checked and returning articles on receipt of check. He may be designated according to article stored as Baggage

Checker, Coat Checker, Hat Checker, Wrap Checker, or Check-room Girl.

11. Locker-Room Attendant - (D.O.T. 358.878) - This attendant may be designated Cage Clerk, Dressing-Room Attendant, Floorman, Locker Attendant, Locker-Room Clerk, Personal Attendant, or Suit Attendant. He may assign dressing room facilities, arrange for valet services, collect soiled linen, and perform cleaning tasks, such as mopping dressing room floors and washing shower room walls.

12. Rest-Room Attendant - (D.O.T. 358.878) - This attendant serves patrons of lavatories in stores, public buildings, hotels, or similar establishments by providing soap and towels, brushing patron's clothing, shining shoes, sewing on loose buttons, and performing related services. He is also responsible for cleaning of the area, replenishing supplies, and may administer first aid to ill or injured patrons.

13. Page Boy - (D.O.T. 353.368) - A page boy conducts visitors on tours of radio and television station facilities and explains duties of members of station staff, operation of equipment, and methods of broadcasting.

14. Nursery School Attendant - (D.O.T. 359.878) - See Teacher, Nursery School, PUBLIC SERVICE.

15. Guide - (D.O.T. 353.368) - A guide escorts visitors through establishments such as museums, aquariums, public or historical buildings, historic or scenic outdoor spots and around towns and cities. He may lecture, give information about particular places, answer questions, assume responsibility for safety of the party, and collect fees. Also see HOSPITALITY AND RECREATION.

16. Host - (D.O.T. 352.868) - A host will greet guests, introduce guests, suggest planned activities, give directions to personnel engaged in serving refreshments, plan menus and supervise activities of food-service workers, plan and participate in social activities, games and sports, and may deposit or pick up guests at railway station, home or other locations as directed. Also see HOSPITALITY AND RECREATION.

17. Airplane Stewardess - (D.O.T. 352.878) - Airline Hostess, Airline Stewardess, Airplane Hostess, Stewardess. See TRANSPORTATION.

18. Stewards - (D.O.T. 310.138) - Stewards, Banquet Steward, Bath Steward, Chief Steward, Club Car Steward, Port Steward, Dining Car Steward, Smoke Room Steward, etc. See specific titles in Dictionary of Occupational Titles and TRANSPORTATION.

19. Piano Tuner - (D.O.T. 730.381) - See FINE ARTS AND HUMANITIES

F. DOMESTIC ANIMAL CARE - The following designations cover occupations concerned with the training and care of domestic animals. Included are areas of service such as boarding, breeding, grooming, cleaning, and training of animals. Specific duties (job classifications) considered are:

. Animal Keeper - (D.O.T. 356.874) - See HOSPITALITY AND RECREATION.

2. Horseshoer - (D.O.T. 356.381) - This occupation is concerned with forging metal bars into horseshoes and fitting and nailing the shoes to hooves of horses and mules using calipers and handtools. He may also examine hooves to detect conditions such as bruises and amount of trimming required and make necessary corrections for proper travel.

3. Animal Caretaker - (D.O.T. 419.884) - See AGRI-BUSINESS AND NATURAL RESOURCES.

4. Aquarist - (D.O.T. 356.874) - An aquarist attends to fish and other marine life on exhibition in aquarium. He may also prepare food, clean tanks, attend to marine plants, observe and report diseased, injured, or dead fish, give medical treatments, and keep records of number and kinds of fish for inventory purposes. Also see HOSPITALITY AND RECREATION.

5. Dog Groomer - (D.O.T. 356.874) - A dog groomer may perform all or a combination of the following duties: Regulate bathwater temperature, wash dog, use handbrush, dry dog, trim and shape dog's hair and toenails using scissors and clippers and clean animal's quarters. He may also be called Dog Bather, Dog Beautician or Dog-Hair Clipper.

6. Dog-Pound Attendant - (D.O.T. 356.874) - This person attends to animals picked up and brought to the pound by feeding and watering them and cleaning and disinfecting their pens. Other duties may include routine repairs to pens and other installations.

7. Kennelman - (D.O.T. 356.874) - A kennelman attends to dogs in kennels. His specific duties may include cleaning kennels and rebedding dog pens, washing and grooming dogs, feeding and watering, observing dogs to detect sickness and presence of disease, exercising dogs, maintaining feed and breeding records, and assisting in training dogs for hunting, guiding, and tracking. He may also be considered a Dog Care Man or Dog Handler.

8. Stableman - (D.O.T. 356.874) - This occupation includes Barn Hand, Feedman, Feed Mixer, Groom, Hostler, Liveryman, Stable Boy, Tackman, and Team Tender. The specific types of tasks performed include caring for horses or mules while animals are in stables to protect their health and improve their appearance, changing or replenishing water, feeding and currying animals, trimming manes and tails, inspecting animals to detect evidence of disease or injury, treating sick animals, cleaning stalls, cleaning troughs, exercising animals, and shoeing animals. He may be designated according to animal cared for as Horse Tender, Mule Tender, or Stallion Keeper.

9. Pet-Shop Attendant - (D.O.T. 356.877) - This person cares for birds and animals in a pet shop. His specific duties include feeding and watering birds and animals, cleaning pens and cages, observing birds and animals for signs of sickness or injury, and transferring birds and animals from one cage to another or removing them according to customer selection either manually or by use of a net.

10. Dog Trainer - (D.O.T. 159.228) - This person trains dogs to perform tricks, hunt, track, obey, protect life and property, run races or lead blind. Other duties may include studying characteristics of each breed to learn how dogs should be handled and to detect signs of sickness, teaching dogs to perform duties or tricks by verbal command or signals, and rehearsing dogs according to the script for motion picture or television film.

11. Horse Trainer - (D.O.T. 153.228; 159.228) - The horse trainer may direct and train horses to perform tricks, follow routines or compete at horse shows. Other duties may include familiarizing horses with harness, bridle, saddle and other riding equipment, conditioning horses, grooming, feeding exercising horses, supervising workers and giving directions for general care of the animals.

G. FOOD AND BEVERAGE PREPARATION AND SERVICE - The following designations cover occupations concerned with preparing food and beverages and serving them to patrons of such establishments as hotels, clubs, restaurants, and cocktail lounges. Included are areas of service such as bartending, baking, cooking, waiting and food assembling. Specific duties (job classifications) considered are:

1. Wine Steward (Hotel and Restaurant) - (D.O.T. 310. 37) - This steward selects, orders, stores, issues and serves wine. He may keep inventory and order wine to replenish stock, store wines vertically or horizontally on racks or shelves, turn wine periodically according to type, discuss wines with guests and taste wine prior to serving.

2. Kitchen Supervisor - (D.O.T. 310.138) - The kitchen supervisor coordinates and supervises the activities of the kitchen, pantry, and storeroom personnel and purchases or requisitions foodstuffs and kitchen supplies. In addition to this, he plans menus, specifies number of servings to be made and sets prices.
3. Counter Supervisor - (D.O.T. 311.138) - The supervisor coordinates and supervises activities of workers engaged in serving food from a cafeteria counter. He directs workers engaged in stocking and arranging food, dishes, silverware and other supplies. He also inspects serving operations, assigns duties, and directs workers engaged in removing food after meals.
4. Bus Boy - (D.O.T. 311.878) - He may be called Clean-Up Boy, Dish Carrier, or Waiter Assistant. He may perform any combination of duties to facilitate food services such as carrying dirty dishes, replacing soiled table linens, cleaning and polishing equipment, and running errands and delivering food orders to offices or nearby establishments.
5. Hostess, Restaurant or Coffee Shop - (D.O.T. 310.868) - The hostess welcomes patrons, seats them at tables or in a lounge, and insures quality and rapidity of facilities and service. She may inspect serving stations, arrange parties, hire and discharge service personnel, and requisition supplies.
6. Bar Boy - (D.O.T. 312.887) - This person cleans the bar and equipment, replenishes supplies, replaces empty kegs, slices and pits fruit, washes glasses, mops floors, removes empty bottles and trash, and may mix and prepare flavors for mixed drinks.
7. Bar Attendant - (D.O.T. 312.878) - This attendant serves alcoholic drinks to patrons in neighborhood taverns or combination bar and package-goods store. He also receives payment for amount of sale and makes change.
8. Chef - (D.O.T. 313.131) - A chef supervises, coordinates, and participates in activities of cooks and other kitchen personnel engaged in preparing and cooking foods in hotel, restaurant, cafeteria, or other establishment. He may purchase food stuffs, supervise cooking and serving, cut, trim and bone meats, employ, train, and discharge workers, and plan menus.
9. Baker - (D.O.T. 526.781) - The baker mixes and bakes ingredients according to recipe to produce breads, pastries, and other baked goods. After the baking process is completed, he applies glaze, icing, or

other topping to baked goods using spatula or brush. He may specialize in baking one type of product such as bread, rolls, pizza, pies or cakes, and may be designated as such.

10. Cook - (D.O.T. 315.381) - The basic duties of a cook are to plan menus and cook meals according to recipes or tastes of employer. A few of his duties include peeling, washing, trimming and preparing vegetables and meat for cooking, cleaning kitchen and utensils, serving meals, making fancy dishes and pastries, and preparing food for special diets. For more specific information refer to the following: Cook, Mess - (D.O.T. 315.381); Cook, Restaurant - (D.O.T. 313.381); Cook, School Cafeteria - (D.O.T. 313.381); Cook, Barbecue - (D.O.T. 313.381); Cook, Breakfast - (D.O.T. 313.381); Cook, Kettle - (D.O.T. 526.782); Cook, Deep Fry - (D.O.T. 526.885); Cook, Helper - (D.O.T. 529.887); Cook, Pastry - (D.O.T. 315.381); Cook, Specialty - (D.O.T. 314.781); and Cook, Vacuum Kettle - (D.O.T. 526.885).

11. Butcher - (D.O.T. 525.381) - This butcher performs slaughtering and butchering operations for custom service, using such cutting tools as cleavers, knives, and saws. He may cut bones from standard cuts of meat such as chucks, hams, loins, plates, rounds, and shanks to prepare them for marketing. See also MARKETING AND DISTRIBUTION; and MANUFACTURING.

12. Coffee Man - (D.O.T. 317.884) - The coffeeman brews coffee, tea, and chocolate, using coffee urns, drip or vacuum coffee maker, teapots, drink mixers, and other kitchen equipment. He may also serve coffee, prepare and issue iced beverages, such as coffee, tea, and fountain or bottled drinks, to be served by waiters.

13. Pantryman - (D.O.T. 317.884) - The pantryman prepares salads, appetizers, sandwich fillings, and other cold dishes. He may also make sandwiches, brew tea and coffee, prepare breakfast and dessert fruits, such as melons, grapefruit and bananas, and serve food to waiters as requested.

14. Sandwichman - (D.O.T. 317.884) - The sandwichman prepares sandwiches to individual order of customers. He may prepare garnishing for sandwiches, such as sliced tomatoes and pickles. He may also cook, mix, and season ingredients to make dressings, fillings, and spreads.

15. Kitchen Helper - (D.O.T. 318.887) - The kitchen helper performs any combination of duties to maintain the kitchen work areas and restaurant equipment and utensils in a clean and orderly condition. The job is basically a cleaning duty; however, he may also transfer supplies, set banquet tables, and wash and peel vegetables.

16. Kitchen Steward - (D.O.T. 318.138) - This steward supervises kitchen employees not actively engaged in cooking to insure clean, efficient, and economical food service. He may assign duties, inspect the kitchen, and hire and discharge employees.
17. Scullion - (D.O.T. 318.887) - See TRANSPORTATION.
18. Food-Service Supervisor - (D.O.T. 319.138) - See CONSUMER AND HOMEMAKING EDUCATION.
19. Order Clerk Food and Beverage - (D.O.T. 319.468) - This clerk takes food and beverage orders over telephone or intercom system and records order on ticket. He may notify kitchen, collect charge voucher and cash for service and keep record of transactions.
20. Waiter - Waitress (Informal) - (D.O.T. 311.878) - This person serves food to patrons at counters and tables of coffeeshops, lunch-rooms, and other dining establishments where food service is informal. Specifically, this person may present menus, make suggestions regarding food, relay orders to kitchen, observe guests to fulfill any additional requests and to perceive when meal has been completed, total bill, and clear and reset counters or tables at conclusion of each course.
21. Waiter - Waitress (Formal) - (D.O.T. 311.878) - This person serves meals to patrons according to established rules of etiquette while working in a formal setting. Specifically, this person may present menus to diner, suggest dinner courses and appropriate wines, and answer questions about food preparation. He may also be asked to serve patrons from chafing dish, carve meats, bone fish and fowl, and prepare flaming dishes and desserts at patrons' table.
22. Bartender - (D.O.T. 312.878) - The bartender may be called Bar Attendant, Barkeeper, or Barman. He may mix and serve alcoholic and non-alcoholic drinks to patrons of a bar, serve wine and beer, collect money for drinks served, order supplies, slice and pit fruit for garnishing drinks, prepare appetizers, and keep the bar area in a neat and orderly manner.
23. Automat-Car Attendant - (D.O.T. 319.864) - This attendant stocks automatic food dispensing machines on railroad passenger cars, makes change, and answers passengers' queries regarding food selections. Also see MARKETING AND DISTRIBUTION.
24. Caterer - (D.O.T. 187. 68) - The caterer plans details of menus with client and gives directions to personnel engaged in preparing and serving food and refreshments at social functions.

25. Fountain Man - (D.O.T. 319.878) - The fountain man prepares and serves soft drinks and ice cream dishes, such as ice cream sundaes, sodas, and fruitades, using memorized formulas and methods or following written directions. He may also clean and polish fountain equipment.

26. Food Assembler - (D.O.T. 319.884) - This person prepares meal trays in commissary kitchen for inflight service of airlines, multi-unit restaurant chains, industrial caterers, or educational institutions.

27. Counter-Supply Man - (D.O.T. 319.887) - This person replenishes food and equipment at steamtables and serving counters of cafeterias to facilitate the service to patrons. He may carry food, dishes, trays, and silverware from kitchen and supply department to serving counters. Other duties may include garnishing foods and positioning them on table, keeping assigned areas and equipment free of spilled food, and keeping shelves of vending machines stocked with food when working in automat.

28. Floor Girl - (D.O.T. 311.878) - The floor girl may also be called Dining-Room Girl, Service Girl, Table Girl, or Waitress. She carries trays from food counters to table for cafeteria patrons, carries dirty dishes to the kitchen, sets tables with clean linens, sugar bowls, and condiments. She may also wash tables, wrap clean silver in napkins, or circulate among diners and serve coffee.

29. Car Hop - (D.O.T. 311.878) - This waitress serves food and refreshments to patrons in their cars. She takes food orders, relays it to the kitchen, places filled order on tray and fastens tray to car door. She then presents check to customer, accepts payment, removes tray, and returns dishes to kitchen.

30. Counterman - (D.O.T. 311.878) - This person serves food to diners seated at the counter. He calls order to the kitchen, picks up and serves the order when ready, accepts payment, and may perform other duties such as cleaning counters, washing dishes, and selling cigars and cigarettes.

PERSONAL
SERVICES

DOMESTIC SERVICES

These designations cover occupations in or about the home which render service for members of the household or their guests.

LODGING AND RELATED SERVICES

These designations cover occupations which provide service or accommodations to persons in homes, boarding houses, hotels, motels, etc.

BARBERING, COSMETOLOGY, AND RELATED SERVICES

These designations cover occupations which are concerned with rendering beauty and/or other related treatments to the body.

DRYCLEANING LAUNDRY AND APPAREL SERVICES

These designations cover occupations concerned with improving the appearance of or repairing such items as clothing, furnishings and accessories.

STEWARDS, ATTENDANTS, AND MISC. PERSONAL SERVICES

These designations cover occupations concerned with greeting, serving, guiding, and otherwise attending to customer desires.

DOMESTIC ANIMAL CARE

These designations cover occupations concerned with the training and care of domestic animals.

FOOD AND BEVERAGE PREPARATION AND SERVICE

These designations cover occupations concerned with preparing food and beverage and serving them to patrons in clubs, hotels, restaurants and cocktail lounges.

ES
the home which render service for

Housekeeper
Yardkeeper
Cook
Maid
Butler

SERVICES
the service or accommodations to

Lodging Manager
Attendants
Maintenance Personnel
Maids and Porters

RELATED SERVICES
ned with rendering beauty and/or

Hair Stylist
Cosmetologist
Barber
Weight-Reducing Attendant
Embalmer

AREL SERVICES
improving the appearance of or
ies.

Cleaners
Presser
Laundryman
Apparel Repairman
Tailor

PERSONAL SERVICES
n greeting, serving, guiding, and

Baggageman
Child-Care Attendant
Guide

RE
the training and care of domestic

Animal Trainer
Animal Attendant
Animal Groomer
Aquarist

ON AND SERVICE
preparing food and beverage and
ocktail lounges.

Chefs
Bakers
Food Assemblers
Kitchen Personnel

PUBLIC SERVICES



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PUBLIC SERVICE

I. INTRODUCTION

The theme of Public Service employment is people-oriented. One must be willing to work with all kinds of people since government -- local, state, federal -- must serve everyone. Many of the public service tasks require longer or at least different hours than those of more traditional employment because the needs of the population cannot always be met from 8:00 a.m. to 5:00 p.m. on weekdays. Furthermore, dealing with people -- their problems, needs, and concerns -- requires an emotional strength and calm temperament that not everyone possesses. Many persons devote their lives to public service, yet unquestionably could have gained far more personal and material benefits had they pursued some other type of activity. For unlike in industry, measurements of competence in community service are neither profit-motivated nor production-oriented. Finally, being service-involved demands a commitment to the task as well as to the society, and this personal commitment may, in fact, distinguish the dedicated public servant from all other workers.

II. METHODOLOGY

In obtaining the services available and the job descriptions, the researcher attempted to contact as many practitioners as possible who were actually involved in the various occupations. In this regard special recognition is given to:

Dora Agee, Manager, Grayson County Teacher's Federal Credit Union, Sherman, Texas.

John Billimek, Customer Service, United States Post Office Department, Dallas, Texas.

Tom Caldwell, Draftsman, City of Sherman, Sherman, Texas.

D.W. Castleberry, Sanitation Department Superintendent, City of Sherman, Sherman, Texas.

Leon Dorsey, Vice President, Texoma Savings and Loan Association, Sherman, Texas.

Clyde Hale, President, Texoma National Bank, Sherman, Texas.

Katherine Koriath, Texas Employment Commission, Sherman, Texas.

Mildred Lawrence, Action Center, Dallas Community Council, Dallas, Texas.

Edgar Peacock, Postmaster, Sherman, Texas.

Thomas Roberts, Compliance Officer, U.S. Department of Labor, Sherman, Texas.

Leon Rubarts, Water Superintendent, City of Sherman, Sherman, Texas.

Bob Safford, Ambulance Service Superintendent, City of Sherman, Sherman, Texas.

Tracy Scoggins, Chief Clerk, Lone Star Gas, Sherman, Texas.

Roy Thompson, Civil Defense Training Officer, Sherman, Texas.

Rose Vineyard, Assistant Vice President, Grayson County State Bank, Sherman, Texas.

Office of Workmen's Compensation Insurance, Sherman, Texas.

Office of Community Council of Greater Dallas, Dallas, Texas.

Additional resource material was obtained from the following publications:

Civil Defense, compiled and published by Department of Defense, Office of Civil Defense (Washington, D.C.).

Community Service and Related Specialists, edited by Sylvia J. Bayliss, and others. J.G. Ferguson Publishing Co. (Chicago, 1970).

Dictionary of Occupational Titles, Vols. I, II, U.S. Employment Service, U.S. Printing Office (Washington, D.C., 1965).

Directory of Health, Welfare and Recreation Services. Compiled and published by Community Council of Greater Dallas, 1971.

Employers' Handbook. Published by Texas Employers Insurance Association, 1971.

Federal Labor Laws and Agencies, Bulletin 123, U.S. Department of Labor, Bureau of Labor Standards (Washington, D.C.).

Guide to Programs and Services. Published by Texas Employment Commission (Austin, Texas, 1970).

Occupational Outlook Handbook 1972-73, Bulletin 1700. U.S. Department of Labor and Bureau of Labor Statistics (Washington, D.C.).

World of Banking. Compiled and published by Administration of National Banks and Comptroller of the Currency (Washington, D.C.).

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual Job Families, with a listing and discussion of the function of individual occupations, are listed below.

A. ADMINISTRATION AND REGULATORY SERVICES - Direct and coordinate the varied activities in local, state, and federal government agencies. Responsible for personnel and labor relations; preparing and administering the budget; establishing accounting procedures; projecting needs precipitated by future growth; insuring proper maintenance of buildings, facilities, and equipment. Responsible for revenue collection program through taxation, bonds, fees.

Provides regulatory services for financial institutions (credit unions, banks, insurance, savings and loans, stock exchanges), public records (birth, marriage, death, titles and deeds), licensing (occupational, institutional, vehicular), customs and immigration (customs inspection, immigration inspection, plant and animal inspection), and facilities (construction purchasing, maintenance).

1. City Managers - (D.O.T. 188.118) - Usually appointed by elected officials (mayor, council, etc.). Duties include appointment of department heads and their staffs; coordination and administration of operations including tax collection and disbursement, law enforcement, maintenance of public works, preparation of annual budget. Study controversial issues, such as unionization of government employees and urban renewal. Plan for future development of cities to provide for growth of population and expansion of public services. Directs a supporting staff including administrative assistants, department head assistants, and assistant city manager.

2. Accountants - (D.O.T. 160.188) - See BUSINESS AND OFFICE.

3. Advertising Workers - (D.O.T. 050.088; 132.088; 141.081 and .168; and 164.068 through .168) - See MARKETING AND DISTRIBUTION.

4. Marketing Research Workers - (D.O.T. 050.088) - See MARKETING AND DISTRIBUTION.

5. Personnel Workers - (D.O.T. 166.088 through .268) - See BUSINESS AND OFFICE.

6. Public Relations Workers - (D.O.T. 165.068) - See BUSINESS AND OFFICE.

7. Purchasing Agent - (D.O.T. 162.158) - See MARKETING AND DISTRIBUTION.

8. Engineers - Contribute in countless ways to welfare, technological progress, and defense of the nation. Develop complex electric power, water supply, and waste disposal systems to meet the problems of urban living. Design industrial machinery and equipment needed to manufacture goods on a mass production basis, and heating, air conditioning, and ventilation equipment for the comfort of man. Also, develop scientific equipment to help probe the mysteries of outer space and the depths of the ocean, and design and supervise the construction of highways and rapid transit systems for safe and more convenient transportation. Design and develop consumer products such as automobiles and refrigerators. Provide the raw materials that make all this possible. Some of the specialties include: aerospace, agricultural, biomedical, ceramic, chemical, civil, electrical, industrial, mechanical, metallurgical, and mining engineering.

a. Aerospace Engineers - (D.O.T. 002.081) - See MANUFACTURING

b. Agricultural Engineers - (D.O.T. 013.081) - See AGRI-BUSINESS AND NATURAL RESOURCES.

c. Biomedical Engineers - (D.O.T. 019.481) - See HEALTH.

d. Ceramic Engineers - (D.O.T. 006.081) - See MANUFACTURING.

e. Chemical Engineers - (D.O.T. 008.081) - See MANUFACTURING

f. Civil Engineers - (D.O.T. 005.081) - Design and supervise the construction of roads, harbors, airfields, tunnels, bridges, water supply and sewage systems, and buildings. Major specialties within civil engineering are structural, hydraulic, sanitary, transportation (including highways and railways), and soil mechanics. Many civil engineers are in supervisory or administrative positions ranging from site supervisor of a construction project or city engineer to top-level executive. Some are engaged in design,

planning, research, inspection, or maintenance activities. Others teach in colleges and universities or work as consultants.

g. Electrical Engineers - (D.O.T. 003.081, .151, and .187) - See MANUFACTURING.

h. Industrial Engineers - (D.O.T. 012.081, .168 and .188) - See MANUFACTURING.

i. Mechanical Engineers - (D.O.T. 007.081, .151, .168, .181, and .187; 011.081 and 019.187) - See MANUFACTURING.

j. Metallurgical Engineers - (D.O.T. 011.081) - See MANUFACTURING.

k. Mining Engineers - (D.O.T. 010.081 and .187) - See MANUFACTURING.

9. Regulatory Services, Financial - These services are provided in the form of insurance and examination through such financial institutions as credit unions, banks, savings and loans, and stock exchanges. Includes an appraisal of assets and management, verification of liabilities, and determination of adherence to the law and sound financial practices to insure solvency and liquidity. Job opportunities might be sought through the regulatory services or the financial institutions, and in either case, a knowledge of accounting, economics, business law, and public relations would be necessary.

a. Bank Officers - (D.O.T. 186.118, .138, .168, and .298; 161.118; 189.118 and .168) - Make decisions within a framework of policy set by the board of directors and existing laws and regulations. Must have a broad knowledge of business activities. Must analyze the collateral, and evaluate carefully the credit analysis on the individual or business firm applying for a loan. Similarly, the trust officer must understand each account he administers. Must invest wisely to manage trust funds which were established for such purposes. Besides supervising financial services, bank officers advise individuals and businessmen and participate in many different kinds of community projects.

b. Tellers - (D.O.T. 212.368) - Small banks may have only one teller --often known as an All-Around Teller -- who handles transactions of all kinds, but in larger banks different kinds of transactions usually are assigned to special tellers, such as: Christmas Club Teller, Commercial (or Paying and Receiving), Savings,

Foreign Exchange, Payroll, Discount, and Securities Tellers. Commercial tellers are the most common. They cash customers' checks, and handle deposits and withdrawals from checking and savings account.

c. Bank Clerks - Handle much of the paperwork associated with checking and savings accounts, loans to individuals and business firms, and other bank business. These duties and job titles are unique to banking industry. Bank Clerks known as Sorters - (D.O.T. 219.388) - separate bank documents, and tabulate. Proof Machine Operators - (D.O.T. 217.388) - who use equipment that, in one operation, sorts items and adds and records the amount of money involved. Bookkeeping Machine Operators - (D.O.T. 214.388) - use either conventional bookkeeping machines or electronic posting machines especially designed for bank work; Transit Clerks - (D.O.T. 217.388) - who sort bank items such as checks and drafts on other banks; Exchange Clerks - (D.O.T. 219.388) - who service foreign deposit accounts. In addition, there are new clerical occupations which have been created by electronic data-processing and which are unique to banks.

10. Regulatory Services, Other - Regulatory services are also provided through public records (birth, marriage, death, titles and deeds), licensing (occupational, institutional, vehicular), customs and immigration (customs inspection, immigration inspection, plant and animal inspection), facilities (construction, purchasing, maintenance). On-the-job training is required in each area.

B. URBAN DEVELOPMENT - American cities -- large and small -- are in trouble. Residents and commuters are plagued with overcrowding, air pollution, transportation difficulties, housing shortages, and growing slums. Trained personnel in urban planning are in high demand to help research and solve urban problems -- to help our cities become more convenient, comfortable, and safe places in which to live and work.

The field of urban planning is open to both men and women. Work opportunities can be found not only in public planning agencies (city, county, regional, state, federal) and private consulting firms, but also in departments of public works (health, parks, and education), in local public housing authorities, building inspection departments, traffic and highway departments, and on a variety of public and private organizations involved in community and human relations activities.

1. Urban Planners - (D.O.T. 199.168) - Develop comprehensive plans and programs for the growth and overall re-vitalization of urban communities. They attempt to remedy urban problems such

as deteriorating business and residential areas, traffic congestion, inadequate parks and recreation facilities, shortages of suitable space for industrial development, and air pollution.

2. Environmental Scientists - The environmental sciences are concerned with the history, composition, and characteristics of the earth's land, water, interior, atmosphere, and its environment in space. They explore for new sources of mineral fuels and ores. Some perform basic research to increase scientific knowledge. Others work mainly in applied research; they use knowledge gained from basic research to solve practical problems (forecast weather conditions for specific localities and times, polluted environment). Many environmental scientists specialize in one particular branch of their broad occupational field. Also see ENVIRONMENT and MARINE SCIENCE.

a. Geologists - (D.O.T. 024.081) - Study the structure, composition, and history of the earth's crust. Examine rocks, minerals, and fossils to determine the distribution and relationship both at and beneath the earth's surface. Gauge the thickness, direction, and slope of rock layers under the earth's surface through rock cores and cuttings by drilling deep into the earth. Search for natural resources such as coal and water. See AGRIBUSINESS AND NATURAL RESOURCES.

b. Geophysicists - (D.O.T. 024.081) - Concerned with the composition and physical aspects of the earth --its size and shape; interior; surface; atmosphere; the land and bodies of water on its surfaces and underground; and the environment of the earth in space. Study the earth's physical characteristics, such as its electric, magnetic, and gravitational fields; the earth's interior heat flow, vibrations, and solar radiation. To conduct their investigations, geophysicists apply the principles and techniques of physics, geology, meteorology, oceanography, geodesy, mathematics, chemistry and engineering.

c. Meteorologists - (D.O.T. 025.088) - Meteorology is the study of atmospheric phenomena -- not only of the earth, but of all celestial bodies. They attempt to describe and understand the atmosphere's constituents, motions, processes, and influences. Their knowledge helps solve many practical problems in agriculture, transportation, communications, health, defense, and business. Also, see MARINE SCIENCE.

d. Oceanographers - (D.O.T. 024.081 and 041.081) - The ocean provides man with valuable foods, fossil fuels, and

minerals. It also influences the weather, serves as a "highway" for transportation, and offers many varieties of recreation. Oceanographers study the ocean -- its characteristics, movements, physical properties, and plant and animal life. The results of their studies not only extend basic scientific knowledge but also contribute to development of practical methods for forecasting weather, fisheries development, mining ocean resources, and national defense. Also, see MARINE SCIENCE.

3. Life Science Occupations

a. Life Scientists - (D.O.T. 040.081, 041.081, 070.081, and 077.128) - Study living organisms, their structure, evolutionary development, behavior, and life processes. They emphasize the relationship between animals, plants, and micro-organisms and their environments. The number and variety of plants and animals are so vast and the life processes so varied and complex that life scientists must specialize in one of three broad areas -- agriculture, biology, or medicine.

Life Scientists may be classified into three broad groups characterized by the general type of organism with which they work; Botanists, who study plants; Zoologists, who are concerned with animals; and Microbiologists, who work with micro-organisms.

The specific Life Scientists areas include: Agronomists, Anatomists, Biochemists, Biological Oceanographers, Biophysicists, Ecologists, Embryologists, Entomologists, Geneticists, Horticulturists, Husbandry Specialists, Nutritionists, Pathologists, Pharmacologists, and Physiologists. See AGRI-BUSINESS AND NATURAL RESOURCES, ENVIRONMENT, and HEALTH.

4. Physical Scientists - The physical sciences deal with the basic laws of the physical world. Many conduct basic research designed to increase man's knowledge of the properties of matter and energy. Others conduct applied research and use the knowledge gained from basic research to develop new products and processes. Three major divisions of physical scientists include: Chemists, Physicists, and Astronomers. For a description of Food Scientist, see CONSUMER AND HOMEMAKING EDUCATION.

a. Chemists - (D.O.T. 022.081, .168, .181, and .281) - Investigate the properties and composition of matter and the laws that govern the combination of elements in a seemingly endless variety of forms. They search for new knowledge about

substances and try to utilize this knowledge for practical use.

The activities of chemists are varied. Some develop new substances such as rocket fuels, solids for transistors, or vaccines. Others determine the chemical composition of a substance and the atomic makeup of its molecules. Still others may be interested in bulk properties, or the rate at which matter undergoes changes in composition, ranging from the combustion in a jet engine to the growth of a living organism. Some chemists work as private consultants to private industries and government agencies.

Biochemists challenge the problems related to the chemistry of life processes.

b. Physicists - (D.O.T. 023.081 and .088) - By determining basic laws governing phenomena such as gravity, electromagnetism, heat flow, and radio-activity, the physicists can anticipate and over-come potential difficulties. Physicists observe and analyze various forms of energy, the structure of matter, and the relationship between matter and energy. From their research, physicists develop theories and discover fundamental laws that describe the behavior of the forces at work within the universe. Their studies have continued to broaden man's understanding of the physical world and have enabled him to make increasing use of natural resources. Physicists have contributed to scientific progress in recent years in areas such as nuclear energy, electronics, communications, and aerospace.

c. Astronomers - (D.O.T. 021.088) - Study the structure, extent, and evolution of the universe. Collect and analyze data on the sun, moons, planets, and stars, and attempt to determine the sizes, shapes, surface temperatures, chemical compositions, and motions of these bodies and make studies of the gases and dust between them. They compute the positions of the planets; calculate the orbits of comets, asteroids, and artificial satellites; make statistical studies of stars and galaxies, and study the origin and nature of cosmic radiation. Astronomers also study the size and shape of the earth and the properties of its upper atmosphere. Astronomical observations are valuable to navigation and the accurate measurement of time.

d. Food Scientists - (D.O.T. 022.081, 040.081, 041.081) - See CONSUMER AND HOMEMAKING EDUCATION.

5. Social Sciences - Concerned with all aspects of human society from the origins of man to the latest election returns. Social scientists, however, generally specialize in one major field of human relationships.

a. Anthropologists - (D.O.T. 055.088) - Study man, his origins, physical characteristics, culture, traditions, beliefs, customs, languages, material possessions, and his structural social relationships and value systems. Some of the specialties include: Ethnologists, Archeologists, Linguists, and Physical Anthropologists.

Anthropologists deal in the administration of dependent people and resettlements. State and local government agencies employ some anthropologists for museum work or health research.

b. Economists - (D.O.T. 050.088) - Study the problems that arise in the utilization of limited resources of land, raw materials, and manpower to provide goods and services. In this connection, they may analyze the relation between the supply of and demand for goods and services, and the ways in which goods are produced, distributed, and consumed. Some economists are concerned with practical problems such as the control of inflation, the prevention of depression, and the development of farm, wage, tax, and tariff policies.

Most government economists are in the fields of agriculture, business, finance, labor, or international trade and development. Also, see MARKETING AND DISTRIBUTION.

c. Geographers - (D.O.T. 029.088 and 059.088) - Study the spatial characteristics of the earth's terrain, minerals, soils, water, vegetation, and climate. They relate these characteristics to changing patterns of human settlement -- where people live, why they are located there, and how they earn a living. Urban geography, a growing field for geographers, is concerned with the study of cities and community planning. Also, see MARKETING AND DISTRIBUTION.

d. Historians - (D.O.T. 052.088) - History is the record of the past -- past events, institutions, ideas, people. Historians use these records to describe and analyze this past -- through writing and teaching, for instance. They also may relate this knowledge of the past to current events, in an effort to explain the present.

A small, but growing number of historians are employed by

government organizations, by non-profit foundations, research councils, special libraries, historical societies, museums and large corporations. Also, see FINE ARTS AND HUMANITIES.

e. Political Scientists - (D.O.T. 051.088) - Political science is the study of government -- what it is, what it does, and how and why. Political scientists are interested in government at every level. Many of them specialize in one general area of political science, such as political theory, U.S. political institutions and processes, comparative political institutions and processes, or international relations and organizations. Political Scientists may study proposed legislation for state or municipal legislative reference bureaus or for congressional committees.

f. Sociologists - (D.O.T. 054.088) - Sociologists study the groups which man forms in his association with others -- families, tribes, communities, and states, and a great variety of social, religious, political, business, and other organizations. They study the behavior and interaction of these groups, trace their origin and growth, and analyze the influence of group activities on individual members. Many work as specialists such as social organization, social psychology, or rural sociology; others specialize in intergroup relations, family problems, social effects of urban living, population studies, or analyses of public opinion. Some conduct surveys or concentrate on research methods. Growing numbers apply sociological knowledge and methods in penology and correction, education, public relations in industry, and regional and community planning. A few specialize in medical sociology -- the study of social factors that affect mental and public health.

g. Psychologists - (D.O.T. 045.088 and .108) - See HEALTH.

6. Engineering and Science Technicians - (D.O.T. .002 through .029) - See MANUFACTURING.

7. Draftsmen - (D.O.T. 001. through 019.) - See MANUFACTURING and CONSTRUCTION.

8. Food Processing Technicians - (D.O.T. 022.281, 029.381) - See CONSUMER AND HOMEMAKING EDUCATION.

9. Technical Writers - (D.O.T. 139.288) - See FINE ARTS AND HUMANITIES.

10. Photographers - (D.O.T. 143.062, .282 and .382) - See FINE

ARTS AND HUMANITIES.

11. Architects - (D.O.T. 001.081) - See FINE ARTS AND HUMANITIES.
12. Landscaping Architects - (D.O.T. 019.081) - See AGRI-BUSINESS AND NATURAL RESOURCES.
13. Systems Analysts - (D.O.T. 033.187, 012.168, 020.081 through 020.088) - See BUSINESS AND OFFICE.
14. Programmers - (D.O.T. 020.188) - See BUSINESS AND OFFICE.
15. Surveyors - (D.O.T. 018.188) - See CONSTRUCTION.
16. Electronic Computer Operating Personnel - (D.O.T. 213.138, .382, .582, .588, and .885; and 223.387) - See BUSINESS AND OFFICE.
17. File Clerks - (D.O.T. 206.388) - See BUSINESS AND OFFICE.
18. Office Machine Operators - (D.O.T. 207.782, .884 and .885; 208.782; 214.488; 215.388; 216.488; 234.582 and .885) - See BUSINESS AND OFFICE.

C. EDUCATION - Since social change is an inevitable part of societies, especially modern societies, education does more than merely transmit the accumulated wisdom of the past. It has the function of adding to the knowledge of the past, helping to select what is to be retained, and making critical evaluations of tradition. For this reason, education, like religion, has complementary and sometime conflicting functions -- those of preservation and innovation.

The trend in education has been toward greatly increased numbers at every level. With the increase in the demand for professional, technical, managerial, and related personnel that has been associated with the changing character of our economy, greater emphasis has been placed on technical-vocational training and more recently, the concept of career education.

1. Teaching - Teaching is the largest of the professions. In addition to the nearly three million full-time teachers, thousands teach part time; among them are many scientists, physicians, accountants, members of other professions and graduate students. Similarly, large numbers of craftsmen instruct part time in vocational schools. Many other people teach in adult education and recreation programs.

- a. Nursery School Teachers - (D.O.T. 359.878) - Includes

Child-Care Leader, Child-Day-Care Center Worker, Nursery School Attendant, Playroom Attendant. Organizes and leads activities of pre-kindergarten children in nursery schools or in playrooms operated for patrons of theaters, department stores, hotels, and similar organizations. Organizes and participates in games, reads to children, and teaches them simple painting, drawing, handwork, songs and similar activities.

b. Kindergarten and Elementary School Teachers - (D.O.T. 092.228) - Provide the children with experiences in play, music, artwork, stories, and poetry; and introduce them to science, numbers, language, and social studies. In a variety of ways, kindergarten teachers help to develop children's curiosity and zeal for learning, as well as to stimulate their ability to think. After school hours, kindergarten teachers may plan the next day's work, prepare the children's school records, confer with parents or professional personnel concerning individual children, participate in teacher's in-service activities, and locate and become familiar with teaching resources.

Elementary school teachers frequently work with one group of pupils during the entire schoolday. They teach several subjects and supervise various activities such as lunch and play periods. In some school systems, however, teachers in the upper elementary grades may teach one or two subjects to several groups of children. Some school systems also employ special teachers to give instruction and to assist classroom teachers in certain subjects such as art, music, physical education, industrial arts, foreign languages, and homemaking. Teachers in schools which have only a few students, largely in rural areas, may be required to teach all subjects in several grades. Programmed instruction, including use of teaching machines and "talking typewriters", and the increasing use of teacher aides are freeing growing numbers of elementary and kindergarten teachers from routine duties and allowing them to give more individual attention to their students.

c. Secondary School Teachers - (D.O.T. 091.118 through .228) - Secondary school teachers -- those employed in junior and senior high schools -- usually specialize in a particular subject. They teach several classes every day, either in their main subject, in related subjects, or both. The teaching method may vary from formal lectures to free discussions, depending on the subject and the students' needs and aptitudes. The choice of method is usually left to the teacher.

Besides giving classroom instruction, secondary school teachers

plan and develop teaching materials, develop and correct tests, keep records, and make out reports, consult with parents, supervise study halls, and perform other duties. The growing use of teaching machines, programmed instruction, and teacher aides relieves the teacher of many routine tasks. Many teachers supervise student activities, such as clubs and social affairs -- sometimes after regular school hours. Maintaining good relations with parents and the community is an important aspect of their jobs.

d. College and University Teachers - (D.O.T. 090.168 and .228) - Most full-time college and university teachers instruct in the social sciences, teacher education, English and journalism, fine arts, mathematics, physical or biological sciences, engineering, or the health professions. Teaching duties may include preparing and delivering lectures, leading class discussions, directing graduate students in teaching freshman courses, preparing tests and instructional materials, counseling and assisting individual students, and checking and grading assignments and tests. Grading is sometimes done by teaching assistants or, for objective tests, by computers. In many two or four-year institutions, the usual teaching load is twelve to fifteen hours a week. Associate professors and full professors -- who advise graduate students and often engage actively in research -- may spend only six to eight hours a week in actual classroom work.

In addition to teaching, many college teachers conduct or direct research, write for publications, or aid in college administration. Some act as consultants to business, industrial, scientific, or government organizations.

2. Counseling - The primary objectives of professional counseling are to help persons understand themselves and their opportunities better so that they can make and carry out decisions and plans that hold potential for a satisfying and productive life. Whatever the area of counseling -- personal, educational, or vocational -- counselors need a concern for individuals combined with a capacity for objectivity; and a belief in the worthwhileness and uniqueness of each individual, in his right to make and accept responsibility for his own decisions, and in his potential for development.

a. Employment Counselors - (D.O.T. 045.108) - See Labor Affairs, this pamphlet.

b. Rehabilitation Counselors - (D.O.T. 045.108) - See Social Services, Rehabilitation, Correction, this pamphlet.

c. School Counselors - (D.O.T. 045.108) - Concerned with the educational, vocational, social and personal development of students. In carrying out their responsibilities, counselors work with students, both individually and in groups, as well as with teachers, other school personnel, parents, and community agencies.

In the process of helping students find their interests and abilities to use in their educational and vocational planning, counselors in secondary schools obtain information from a variety of sources. These include talking with students, referring to their school and other records, and using tests to help assess a student's chances of success in given studies or occupations. The counselor then helps the student analyze and interpret the results, and develops with him -- and sometimes with his parents, as well -- a course of study and an educational plan fitting his abilities, interests, and vocational opportunities.

d. College Career Planning and Placement Counselors - (D.O.T. 166.268) - Career planning and placement counselors, sometimes called college placement officers, provide a variety of services to college students and alumni. They are concerned with the aspects of a student's development involving his career selection: studying himself, exploring and choosing an occupational area, making a decision either to pursue graduate study or to enter the labor market. They also aid students in obtaining part-time and summer positions to meet an economic need or to assist in career exploration.

They arrange for employer representatives to visit the campus to discuss their firms' personnel needs and to interview qualified applicants. Career planning and placement counselors provide information about students to employer representatives and assist in appraising the qualifications of students. They also make new contracts with employers to develop additional employment opportunities. In addition, they may suggest improvements in employer recruitment literature and inform the college faculty of any change in job requirements that might warrant adjustment in curriculum.

3. Supervision - Those in supervisory capacities have at least equal training of those in the teaching fields, in addition to administrative skills; and they are knowledgeable in getting along with professional people.

4. Support Activities

a. Librarians - (D.O.T. 100.118 through .388) - Making information available is the job of librarians. Librarians select and organize collections of books, pamphlets, manuscripts, periodicals, clippings, and reports, and assist readers in their use. In many libraries, they also may make available phonograph records, maps, slides, pictures, tapes, films, paintings, braille and talking books, microfilms, and computer tapes and programs. In addition to classifying and cataloging books and other loan items, they publicize library services, study the reading interests of people served by the library, and provide a research and a reference service to various groups. Librarians also may review published materials and prepare bibliographies.

b. Library Technicians - (D.O.T. 249.368) - Assist librarians in furnishing information on library sciences, facilities, and rules; in assisting readers in the use of card catalogs and indexes to locate books and other materials; and in answering questions that require only brief consultation of standard references. In some libraries, they train and supervise the clerical staff. Cataloging books is one of their most important duties.

c. Educational Assistants - Relieve certified teachers of many time-consuming tasks that may be done as well by a person with less training. The work of classroom teachers has become so demanding that educational assistants are now being hired to do paperwork, order supplies, check attendance, help decorate bulletin boards, operate audio-visual equipment, assist in the laboratory, shelve library books, collect milk money, drill children in reading and spelling, help children with clothing, proctor tests. They also supervise lunchrooms, study halls, and playgrounds, and generally relieve teachers of a number of tasks and enable them to spend more time teaching.

d. Museum Personnel - (D.O.T. 102., 109.) - See FINE ARTS AND HUMANITIES.

e. Archivist - (D.O.T. 101.168) - See FINE ARTS AND HUMANITIES

f. Zoo Personnel - This may include such speciality areas as Zoologist - (D.O.T. 041.081), Animal Keeper, Caretaker, Commissary Man, and Veterinarian - (D.O.T. 073.108). See HOSPITALITY AND RECREATION.

g. Media Center Personnel - (D.O.T. 099.168, 100.168, 100.388, 109.388) - The Audio-visual Specialist plans preparation and use of audiovisual teaching aids and methods in school

system. Reviews, evaluates, and recommends audiovisual aids for clarity and educational value. The Audiovisual Librarian plans film programs and keeps library of film and other audiovisual materials. The Audiovisual Technician translates educational or advertising ideas into films, programmed learning materials, photos, tape recordings, television programs, or any of a combination of various media. In addition, the Media Center Personnel may actually prepare these aids.

5. Transportation - School busing continues to involve more and more people, and with involvement comes specialization. Some of the specialty areas include Driver - (D.O.T. 913.463), Maintenance - (D.O.T. 184.168), and Dispatcher - (D.O.T. 913.168). Also see TRANSPORTATION.

6. Extension Service

a. Agricultural - See AGRI-BUSINESS AND NATURAL RESOURCES.

b. Home Economics - See CONSUMER AND HOMEMAKING EDUCATION.

D. PROTECTIVE SERVICES - Protective services are available to us in many forms. They may be on of the conservation occupations such as a Forest Ranger protecting wildlife or an FBI Special Agent investigating espionage and sabotage. Appropriate bachelor's degree generally is necessary; however for the semi-professional positions, short-term or on-the-job training generally is necessary.

Work activities in this group primarily involve conducting investigations and examinations designed to determine or insure compliance with statutes, ordinances, and similar regulations affecting the public interest and welfare; and otherwise enforcing laws or regulations designed to protect citizenry from harm to themselves or their property.

1. Law Enforcement

a. Federal Bureau of Investigation (FBI) Special Agents - (D.O.T. 375.168) - Investigate many types of violations of Federal laws, such as bank robberies, kidnappings, frauds against the Government, thefts of Government property, espionage, and sabotage.

b. Security Officers, Guards and Watchmen - (D.O.T. 372.868) - Patrol and inspect property to protect it against fire, theft, vandalism, and illegal entry. Examples of employment would be in office buildings, banks, hospitals, department stores, ports and

railroads, public buildings such as museums or art galleries; large factories, aircraft plants, and defense installations where valuable information must be protected; social affairs, sports events, conventions, and other public gatherings.

c. Police Officers - (D.O.T. 373.118 through .868 and 377.868) - Whether directing traffic at busy intersections or arresting dangerous criminals, Police Officers are helping to preserve law and order. As local government employees, their job is to prevent criminal activities, to investigate crimes, and to apprehend and assist in the prosecution of offenders. Whether on or off duty, they are expected to exercise their authority whenever necessary.

d. State Police Officers - (D.O.T. 375.118, .138, .168, .228, .268, and .388) - State Policemen (State Highway Patrolmen or Troopers) are protective service officers whose primary responsibility is to enforce the laws and regulations governing the use of highways. Officers spend most of their time patrolling highways to insure that traffic laws are obeyed and issuing traffic tickets to motorists who violate the law. When necessary, they testify in court. They assist at the scene of traffic accidents. They give first aid to injured persons, summon ambulances and other emergency equipment, and direct traffic to avoid additional accidents. Patrolmen conduct investigations of accidents and write reports containing information that may be used as legal evidence in determining cause and liability.

e. Sheriffs and Bailiffs - (D.O.T. 377.868) - Enforce laws and serve legal processes of courts. Drive vehicle or patrol on foot specified area to detect infractions of law. Escort prisoners to and from courtroom or from one prison to another, subduing unruly prisoners if necessary. Keep order in courtroom. Serve summonses and subpoenas and keep records of disposition.

2. Inspectors and Investigators - (D.O.T. 168.168) - This group includes occupations concerned with examining people, animals, plant life, products, and establishments, in the capacity of city, county, federal, or private inspector or investigator, for enforcement of health, safety, and other regulatory laws. Much of this effort would be directed in the area of accident prevention.

3. Special Services

a. Firefighters - (D.O.T. 373.118 through .884) - Firefighters must be prepared at a moment's notice to rush to a fire and handle any emergency that occurs. Because firefighting is dangerous

and complicated, it requires teamwork and must be well organized. At every fire, fighters perform specific jobs assigned to them by a commanding officer; they may connect hose lines to hydrants, operate a pump, position ladders, or perform some other duty. Furthermore, the assigned duties of individual firefighters may be changed several times while the company is in action. Under emergency conditions firefighters are often called on to use their own initiative and judgement. Fire prevention is another important responsibility of municipal fire departments.

b. Foresters - (D.O.T. 040.081) - See AGRI-BUSINESS AND NATURAL RESOURCES.

c. Forestry Aides - (D.O.T. 441.384) - See AGRI-BUSINESS AND NATURAL RESOURCES.

d. Range Managers - (D.O.T. 040.081) - See AGRI-BUSINESS AND NATURAL RESOURCES.

e. Radio Dispatcher - (D.O.T. 379.368) - Receives complaints from public concerning crimes and police emergencies, broadcasts orders to police radio patrol units in vicinity to investigate complaint, and relays instructions or questions from remote units. Records calls and complaints received. In some municipalities coordinates all police, fire, ambulance, and other emergency requests, relaying instructions to radio unit concerned. May make operating adjustments to transmitting equipment where station is not automatic, and be required to hold Federal license.

f. Electronic and Other Equipment Maintenance - See COMMUNICATIONS AND MEDIA.

g. Fire and Police Equipment Maintenance - See TRANSPORTATION for general discussion for vehicle maintenance personnel.

h. Ambulance Attendant - See HEALTH.

4. Military - (D.O.T. 378.) - The Armed Forces are maintained through voluntary enlistment, supplemented by a Selective Service System which drafts young men between eighteen and twenty-six. A young man may enlist in any one of a variety of programs involving different combinations of active service and reserve duty; or he may wait to be drafted for a two-year period of active duty, followed by four years in the reserves; or, if qualified, he may enter one of several officer training programs and discharge his obligations in a commissioned status.

Additional choices for fulfilling a military obligation are available in reserve programs. One of these choices allows a young man to fulfill his military obligation by enlisting in the reserves for six years, at least four months of which are spent in active duty training. These enlistment choices and the draft, however, are subject to change at any time by congressional action. The alternative choices described here in general way serve only to illustrate a few possibilities. Detailed up-to-date information can be obtained from local Armed Forces recruiting stations or from publications available at high schools, colleges, and state employment service offices. Military service for women is available through a number of branches: Marine II, SPAR, WAC, WAF, and WAVE.

5. Civil Defense - Basically, civil defense in the United States is civil government -- federal, state, local -- prepared for effective action to limit damage and speed recovery in the event of a major disaster, i.e., natural disaster or enemy attack. A natural disaster is defined as fire, falling aircraft, flood, earthquake, and tornado. At the national level, civil defense emphasizes the role of civil government in national defense. Most of the jobs are filled through coordinated efforts of volunteer citizens, under the leadership of a Civil Defense Training Officer.

a. Civil Defense Training Officer - (D.O.T. 169.168) - Coordinates civil defense public information program in community or region, and instructs paid and volunteer workers in techniques for meeting disaster situations. Prepares information materials, such as pamphlets, speeches, and radio scripts to inform public of preparedness measures. Addresses civic groups and participates in broadcasts to alert citizenry to need for civil defense activity. Conducts classes in first aid, use of radiological monitoring equipment and techniques, shelter management, fire-fighting, disaster communications and organization, and post-attack operations for paid or volunteer workers. Confers with federal and state authorities, and with representatives of police, fire, sanitation and public works departments to coordinate training efforts. May participate in or prepare surveys of physical geography of area for formulating post-attack plans. May specialize in one or more phases of civil defense activity in addition to training and be designated according to responsibility as Civil Defense Operations Officer, Civil Defense Radiological Officer, Shelter Management Officer.

E. POST OFFICE - The Post Office Department has been converted to the United States Postal Service under the Postal Reorganization Act (PL-91-370) of August 12, 1970. The Department is applying modern marketing

techniques toward improving the postal product line by accepting the challenge of providing better service for the postal customers through professional planning, creative product development and expanded cooperation between customers and the Postal Service.

This marketing philosophy is new to the Postal Service. Instead of developing products and services independent of the customer as in the past, the Department is now attempting to respond to the needs of its customers for mutual benefit. The essence of marketing is simple; a business is better off designing what the customers want to buy than trying to sell them what it happens to have designed.

Post Office Department Employees are no longer under Civil Service. The U.S. Postal Service is an independent agency of government service. While the employees do enjoy some of the Civil Service benefits such as retirement, insurance, veteran's priority, they do not take Civil Service examinations, but rather the Department devises and administers its own tests and has its own labor union.

Rather than being politically oriented, the new system is career oriented giving more advancement at lower levels with promotions coming within the service according to ability and merit. Washington headquarters still make policy, but this policy is transmitted to five Regional office (New York, Eastern, Central, Western, and Southern). These Regional offices can determine how this policy will be carried out, and the dictum is fed to District offices.

Heretofore, management could not deal with the union because everything was controlled by congress. Now, management deals directly with the union rather than the lobbyists.

1. Management - This would include the administration positions within the United States Postal Service in Washington, D.C., as well as the five Regional offices throughout the nation.
2. Postmaster - (D.O.T. 188.168) - Supervises and coordinates activities of workers engaged in postal and related work in assigned post office. Resolves customer complaints and informs public of postal laws and regulations. Submits detailed and summary activity reports to designated superior.
3. Supervisor
 - a. Superintendent of Mails (also, Assistant Superintendent of Mails) - Has general charge under the Postmaster of all mail handling operations. Gives immediate supervision over all

mail services of the post office including distribution and dispatch of outgoing mails and distribution and delivery of incoming mails.

b. Foreman of Mails - Serves as the working supervisor in charge of a group of approximately ten or fewer employees engaged in distributing incoming, outgoing or transit mail, providing window services, or performing related clerical duties.

4. Crafts

a. Mailhandlers - May be found in the larger post office installations only. They do not work the mail which requires knowledge of sorting procedures, but rather they physically handle the mail, transferring it, loading/unloading the mail to/from trucks. Sometimes they may operate a mail cancelling machine.

b. Clerical - (D.O.T. 232.368) - Sells stamps, savings certificates, money orders; registers and insures mail; sorts and examines mail.

c. Carrier - (D.O.T. 233.388) - Sorts mail for delivery and delivers mail on established route. Completes delivery forms, collects charges, and obtains signature on receipts for delivery of specified types of mail.

d. Motor Vehicle - May be found in larger post offices only. This is a facility for maintaining (mechanically) all post office vehicles, and also the necessary record keeping.

e. Special Delivery - May be found in larger post offices only. These employees deliver all special delivery mail upon arrival. They may also perform some clerical work such as getting the mail ready to be worked.

F. PUBLIC UTILITIES - Many types of workers are needed to produce, develop markets, and distribute public utilities to the consumer. There are managerial workers including professional and technical; white-collar workers, mostly in clerical occupations such as telephone operator, secretary, and bookkeeper; blue-collar workers are in the majority with craftsmen, foremen, and kindred workers, including motor vehicle mechanic, telephone lineman, locomotive engineer, and stationary engineer; and also laborers, such as material handlers and truckdrivers' helpers.

Public utility firms are regulated closely by commissions or by other public authorities such as the State Water Quality Board, to make sure

They operate in the public interest.

Public utility includes water systems, sanitary service, electric service, gas service, and steam supply.

1. Water Systems - This may include water and wastewater. (For more detail on wastewater, see Sanitary Service of this pamphlet.) Specialized training is required in order to provide water that is safe for human consumption, and provide an available supply. This special training produces certified operators in charge of water utility systems. The distribution system includes residential, business, and industry through water mains, valves, fire hydrants, and service meters. The State Health Department exercises regulatory controls.

General personnel requirements include quality control, maintenance, machinery operators, heavy equipment operators, mechanics, and truck drivers. Some of the specialized areas include:

a. Pumping Station Foreman - (D.O.T. 954.130) - Supervises and coordinates activities of workers engaged in operating equipment, such as pumps, valves, turbines, and electric motors to transfer, distribute, and regulate pressure and flow of raw and processed water. Trains workers in operation and maintenance of equipment. Records data.

b. Water Treatment Plant Operator - (D.O.T. 954.782) - Controls treatment plant equipment to purify and clarify water for human consumption and industrial use. Controls flow of raw water into plant by starting and regulating operation of electric motors, pumps, and valves. Adds specified amounts of chlorine, ammonia, lime, or other chemicals to disinfect, deodorize, and clarify water, or adjusts automatic devices which admit chemicals in controlled amounts. Monitors control panel consisting of meters and gages to determine rate of flow, loss of head, and water elevation, and manipulates switches adjust distribution of water. Records such data as residual content of chemicals, water turbidity, and water pressure. May filter water through rotating screens to remove coarse impurities.

2. Sanitary Service - This may include many services from wastewater handling to garbage truck pickup. Wastewater is collected through underground lines which collect refuse from home, business, industry. It is piped to a central treating plant. Sanitary Service may also include garbage and trash collection. Disposition of such waste has become a major problem. Many municipalities are going to landfill systems where the collection is sorted, compacted, dumped, and

covered. Such systems require Helpers, Truckdrivers, Routemen, and Bulldozer Operators. For information on operation and maintenance of vehicles and heavy equipment, see TRANSPORTATION and CONSTRUCTION.

a. Wastewater Treatment Plant Operator - (D.O.T. 955.782) - Controls equipment and facilities to remove waste materials or render them harmless to human, animal, and fish life. By operating and maintaining pumps, piping, and valves that connect system to the wastewater treatment facility, operators move the wastewater through the various treatment processes. These processes make water fit for human consumption, or acceptable to dump into receiving streams.

3. Electric Service - Electricity is produced primarily in steam-powered generating plants which use coal, gas, or oil for fuel. Some new steam generating stations use nuclear energy as a fuel.

a. Boiler Operators - (D.O.T. 950.782) - Regulate the fuel, air, and water supply in the boilers and maintain proper steam pressure needed to turn the turbines, on the basis of information shown by gages, meters, and other instruments. Boiler Operators are employed only where steam is used to generate electricity.

b. Turbine Operators - (D.O.T. 952.138) - Control the operation of steam or water-powered turbines which drive the generators. They record the information shown by these instruments and check the oil pressure at bearings, the speed of the turbines, and the circulation and amount of cooling water in the condensers which change the steam back into water.

c. Watch Engineers - (D.O.T. 950.131) - Principal supervisors in a powerplant oversee the employees who operate and maintain boilers, turbines, generators, auxiliary equipment, switchboards, transformers, and other machinery and equipment.

d. Load Dispatchers - (D.O.T. 950.168) - These are the key-operating workers of the transmission and distribution departments. They control the flow of electricity throughout the area served by the utility. The load dispatcher's room is the nerve center of the entire utility system.

e. Lineman - (D.O.T. 821.381) - Construct and maintain the network of powerlines which carry electricity from generating plants to consumers. Their work consists of installations, equipment replacements, repairs, and routine maintenance work.

f. Groundmen - (D.O.T. 821.887) - Dig poleholes and assist the linemen and apprentices to erect the wooden poles which carry the distribution lines. They bolt crossarms; bolt or clamp insulators; raise the wires and cables and install them on the poles or towers by attaching them to the insulators; attach a wide variety of equipment to the poles and towers, such as arrestors, transformers, and switches.

4. Gas Service - Professional, technical, and kindred workers are concentrated largely in the petroleum and gas extraction industry. Most of them are engineers, geologists, or technicians engaged in exploration and research. Because the processes of finding and extracting crude oil and natural gas are the same, jobs involved are similar until the gas or oil well starts producing. Workers in petroleum exploration and production are required to have a wide range of education and skills to drill, operate, and maintain wells.

a. Petroleum Geologists - (D.O.T. 024.081) - Study the surface and subsurface composition of the earth. Besides making detailed, foot-by-foot ground surveys, petroleum geologists depend on aerial exploration and magnetic surveys. Some geologists specialists include: Paleontologists, Mineralogists, Stratigraphers, Photogeologists, Petrologists, and Draftsmen. See AGRI-BUSINESS AND NATURAL RESOURCES.

b. Geophysicist - (D.O.T. 024.081) - Usually leads a seismograph crew which may include: Prospecting Computers - (D.O.T. 010.288) - who perform the calculations and prepare maps from the information recorded by the seismograph; Observers (D.O.T. 010.158) - who operate and maintain electronic seismic equipment; Shorthole Drillers - (D.O.T. 930.782) - and their Helpers - (D.O.T. 930.886) - who operate portable drilling rigs to make holes into which explosive charges are placed; and Shooters - (D.O.T. 931.381) - who place and detonate explosive charge. Before geophysical exploration begins, permission must be obtained to use the land. The Landman or Leaseman - (D.O.T. 191.118) - makes the necessary business arrangements with land owners or with owners of mineral interests. See AGRI-BUSINESS AND NATURAL RESOURCES.

c. Petroleum Engineers - (D.O.T. 010.081) - Devise methods to improve oil or gas well production and determine need for new or modified tool designs. May be designated Gas Engineer if worker is concerned only with natural-gas production. Overall planning and supervision of drilling are usually the responsibilities of the Petroleum Engineer who helps to prepare the drilling sites.

The drilling operation would include such specialties as: Rig Builders - (D.O.T. 869.884), Rotary Driller - (D.O.T. 930.782), Derrickman - (D.O.T. 930.782), Engineman - (D.O.T. 950.782), Tool Pusher or Chiefdriller - (D.O.T. 931.130), and Roustabout - (D.O.T. 869.884). See AGRI-BUSINESS AND NATURAL RESOURCES.

d. Dehydration Plant Operator - (D.O.T. 541.782) - Tends an automatically controlled treating unit which removes water and other impurities from natural gas.

e. Compressor Station Operator Engineer - (D.O.T. 914.132) - Operates a compressor which raises the pressure of the gas for transmission in the pipelines.

f. Gas Plant Operator - (D.O.T. 953.380) - Controls equipment in small gas plant to produce, purify, and store or distribute carbureted water gas.

5. Customer Service Occupations - There are numerous jobs in each area of Public Utilities which would be sales and service. See MARKETING AND DISTRIBUTION.

a. Home Service Advisor (Home Economists) - (D.O.T. 096.128) - See CONSUMER AND HOMEMAKING EDUCATION.

b. Appliance Salesman - See MARKETING AND DISTRIBUTION.

c. Public Utilities Salesman - (D.O.T. 257.358) - Solicits prospective and existing commercial and residential clients to promote increased use of public utilities. Inspects installations in existing establishments or reviews plans for new construction to determine potential need or necessity for extension of utility service.

d. Meterman - (D.O.T. 729.281) - Installs, tests, maintains, and repairs meters on customers' premises, particularly those of large industrial and commercial establishments.

G. PUBLIC HEALTH - Public health must provide: vital statistics, environmental sanitation, communicable disease control, laboratory services, maternal and child health, chronic disease control and promotion of adult health, and health education.

The vehicles for providing such services include: institutional care (nursing homes, mental hospitals, general hospitals, and half-way houses); community services (out-patient clinics, emergency services, community

health centers, home health care); food and drug (sanitation, meat and other foods, drug control); research (pollution control, communicable disease centers, mental health).

See HEALTH for specific job titles and descriptions, with these possible exceptions:

1. County Health Officer - (D.O.T. 070.108) - Responsible for health services for a county. Provides medical care for eligible persons, and institutes program of preventive health care in county, city, or other government or civic division. Gives vaccinations, imposes quarantines, and establishes sanitary and other health standards for hospitals, restaurants, and other public places.
2. Sanitarian - (D.O.T. 079.118) - Plans, develops, and executes environmental health programs. Organizes and conducts training program in environmental health practices for schools and other groups. Determines and sets health and sanitation standards and enforces regulations concerned with food processing and serving collection and disposal of solid wastes, sewage treatment and disposal, plumbing, vector control, recreational areas, hospitals and other institutions, noise, ventilation, air pollution, radiation, and other areas. May be assisted by a Sanitary Inspector - (D.O.T. 168.287).
3. Field Health Officer - (D.O.T. 168.168) - Locates, advises, and questions persons suspected of exposure to communicable diseases to prevent further spread of disease. Traces exposed persons; advises them to seek treatment; writes reports of findings. Sometimes referred to as an Epidemiological Investigator, or a V.D. (venereal disease) Investigator.

H. LABOR AFFAIRS - The early socialists, including Karl Marx, prophesied that capitalist society would inevitably polarize into manual workers and big capitalists, with the virtual eclipse of the middle class. Just the opposite has happened. White-collar workers (generally occupants of middle-class positions) now exceed manual workers, exclusive of those in the service category.

In the past, the working time of laborers, craftsmen, and clerks generally exceeded that of their "superiors". But within contemporary America, a paradoxical situation has developed. Skilled and semi-skilled workers generally work shorter hours than professional men, the self-employed, managers, executives, engineers, and technicians.

1. Employment Services

a. Texas Employment Commission - TEC's major service is that of job placement. The Commission includes an Administrator, Associate Administrator, and Administrative staff at the state level; also, District Director, and Clerical workers at the local level.

Along with offering placement services in the local industries, they offer many job opportunities in government programs.

b. Manpower Development and Training (MDTA) - Provides occupational training and basic education for adults and youth to meet shifting labor demands due to such factors as technological relocation of industries. The Texas Education Agency and local vocational education officials working with Texas Employment Commission are responsible for developing training plans and providing for training facilities.

c. Job Corps - A nationwide residential training program for out-of-school, out-of-work, underprivileged young men and women. This is a program of basic education, skill training, and useful work experience.

d. Neighborhood Youth Corps - Has two programs for young men and women. One program provides part-time work training for youth from low income families who are in the ninth through twelfth grade of school or of comparable age. The other program provides low income unemployed out-of-school youth with useful work training experience combined, where needed, with education and training assistance.

e. Operation Mainstream - Provides meaningful work experience and training for the chronically unemployed over twenty-one years of age who have poor employment prospects and who are unable, because of age or other factors, to secure appropriate employment or training assistance under other programs.

f. Public Service Careers - Prepares unemployed, low income adults for entry into career jobs in public service as sub-professional personnel. Sponsors for these projects may be federal, state, or local public agencies, or private non-profit organizations.

g. Jobs for Progress - Directed toward improving the economic status of Spanish-speaking and other underemployed or unemployed citizens.

h. Work Incentive Program - Offers education, work training, and employment services to recipients of Aid to Families with Dependent Children. Applicants meeting disadvantaged eligibility criteria are referred to employers having contracts under Defense Manpower Policy No. 4.

i. Annual Worker Plan - Provides maximum employment for migrant agricultural workers throughout the year. Migratory worker crews are directed by the Texas Employment Commission from employer to employer as seasonal agricultural activities demand.

j. Farm Crew Leader - Any individual who transports or causes to be transported across State lines ten or more workers excluding his immediate family is required to register as a farm labor contractor or crew leader. The Crew Leader makes application for registration through the local TEC office.

k. Employment Counselor - (D.O.T. 045.108) - Helps individuals seeking aid to develop a career goal that will fulfill their potential and bring personal satisfaction. They assist clients by planning with them how to prepare for and enter careers, and how to make progress in them. The counselor must obtain vocationally significant information related to their personal traits, interests, training, work experience, and work attitudes.

2. Employment Compensation - The prevention of injuries to employees is a basic concern to employers. Successful accident prevention eliminates needless suffering by employees, brings about higher employee morale, less labor turnover, improved overall efficiency of operations, and worthwhile reductions in the cost of workmen's compensation insurance.

a. Insurance Job Opportunities - See BUSINESS AND OFFICE.

b. Safety Engineer - (D.O.T. 012.081) - Applies knowledge of industrial processes, mechanics, chemistry, psychology, and industrial health and safety laws to prevent or correct injurious environmental conditions and minimize effects of human traits which create hazards to life and property or reduce worker morale and efficiency. He examines machinery and equipment; designs safety devices; inspects premises and equipment; studies each accident to overcome the cause; educates employer and employee in safety measures.

3. Labor Standards - Though it is claimed that the Germans and Swiss

work harder than we Americans, it is doubtful that there are any other people on earth to whom work is as important to a man's sense of self. Problems arise for us when work has too little meaning, when it conflicts with other areas of our lives, when there is too little for us, or when the rewards of work are insufficient or its conditions oppressive. The occupations listed below have developed to eliminate, insofar as possible, those elements which threaten job satisfaction.

- a. Safety Engineers - (D.O.T. 012.081) - See Labor Affairs, this pamphlet.
- b. Safety and Sanitary Inspectors - (D.O.T. 168.268) - Inspect equipment and observe work activities of employees in industrial plants for conformance to local sanitary and safety regulations. Follow up medical reports of accident cases to determine seriousness of injuries and possible complications.
- c. Time-Study Engineer - (D.O.T. 012.188) - Develops work measurement procedures and directs time-and-motion studies to promote efficient and economical utilization of personnel and facilities. Applies mathematical analysis to determine validity and reliability of sampling and work study statistics. Applies principles of industrial psychology to evaluate work methods proposals and to develop recommendations to management affecting work methods, wage rates, and budget decisions. Trains Industrial-Engineering Technician in time-and-motion study principles and techniques.
- d. Compliance Investigator - (D.O.T. 168.168) - Investigates business establishments and individuals to settle claims or insure compliance with state and federal laws and regulations, such as those governing child labor, wages and hours, and financial responsibility. Interviews persons, observes environmental conditions, and examines records, such as financial statements, payrolls, correspondence, and school grade-transcripts, to obtain or verify information and determine individual's or firm's responsibility under law. May make determinations and judgments and settle claims.
- e. Labor Union Business Agent - (D.O.T. 187.118) - Manages functions of labor unions, such as relations of union with public, press, and employers, promoting membership, placing union members in jobs, arranging details of meeting, hiring halls, and obtaining speakers. Negotiates with management in hours, wages, individual grievances, and other matters affecting employees.

May assist in developing plant operations, such as production, safety, and health programs.

f. Union Time-Study Man - (D.O.T. 161.118) - Reviews time-study data, conducts time studies, and arbitrates pay rate disputes. Reviews production reports of each shop group. Evaluates payroll data and work tickets to reconcile difference between assumed earnings of shop groups and payroll figures. Confers with union stewards, production workers, and company time-study personnel to review disputes and adjust pay rate problems.

I. PUBLIC TRANSPORTATION - The tremendous advances and growth in public transportation have resulted in the need for numerous skills and technologies.

The design, construction, and maintenance of public highways requires planning, land acquisition, bridges and tunnels, engineering and inspection, road repair, care of right-of-way, landscaping, toll collection, and electronic and electric equipment installation and maintenance.

Public transportation -- land, air, water -- provides jobs in such areas as rapid transit, railroads, buses and trucks, airports and terminals, traffic control, maintenance, inland waterways operation, port authorities, turn-pike and tollbridges, registration and licensing, and inspection.

For specific job titles and descriptions, see TRANSPORTATION.

J. SOCIAL SERVICES, REHABILITATION, CORRECTION - Development of a more complex urban society has greatly increased the need for organized social services, rehabilitation, and correction. These services include voluntary, and governmental health, welfare, recreation, and other programs of human services.

1. Social Workers - (D.O.T. 195.108), .118, .168, .208, and .228) - The problems which concern social workers include poverty; broken homes; physical, mental, and emotional handicaps; antisocial behavior; racial tensions; and unsatisfactory community conditions such as inadequate housing and medical care, and lack of educational, recreational, and cultural opportunities.

As noted by the Dictionary of Occupational Titles, training as a Social Worker will enable one to choose from a number of specialty areas.

a. Family Service positions in state and local governments and

voluntary agencies provide counseling and social services that strengthen family life and help clients to improve their social functioning.

b. Child Welfare positions in government and voluntary agencies improve the physical and emotional well-being of deprived and troubled children and youth.

c. Social Aid Children whose unsatisfactory behavior or progress in school is related to their social problems, are the concern of social workers. These workers consult and work with parents, teachers, counselors, and other school personnel in identifying and seeking a solution to the problems that hinder satisfactory adjustment.

d. Hospitals, Clinics, Health Agencies, Rehabilitation Centers, and Public Welfare Agencies employ social workers who aid patients and their families with social problems accompanying illness, recovery, and rehabilitation. They usually function as part of a medical team composed of physicians, therapists, and nurses.

e. Mental Health Centers, Mental Hospitals or Clinics employ social workers. As members of teams which also include psychiatrists, psychologists, and other professional personnel, they develop and report the information on the patient's family and social background for use in diagnosis and treatment.

f. Rehabilitation Services are provided by the social worker in assisting the emotionally or physically disabled in adjusting to the demands of everyday life.

g. Probation and Parole are other roles of a social worker in assisting persons on probation and parole and juvenile offenders in readjusting to society. They investigate the social history and background of the person under the jurisdiction of the court and make reports to the court to help the judge in his judicial decisions. They also counsel persons on probation or parole, may help them secure necessary education or employment, and direct them to other services in the community.

2. Social Service Aides - Social service or social welfare aides, by freeing the professional social workers for more creative and supervisory responsibilities, enables the social welfare agency to provide more and better service to its clients. Most work under the close guidance and supervision of a social worker or counselor. They are usually referred to as Casework Aides or Assistants (Homemaker

Aides, Outreach Workers, Neighborhood Workers, Employment Aides).

3. Institutional Child Care Technician - Most institutionalized children between the ages of six and eighteen live in cottages or other small-group residences where a family environment can best be approximated. Institutional child care technicians are specialists who have been trained to work with these children as cottage parents or houseparents, guiding and advising them, making sure they keep appointments and do homework, and helping to organize the children's leisure activities.

4. Rehabilitation Counselors - (D.O.T. 045.108) - See Education, this pamphlet.

5. Lawyers - (D.O.T. 110.108, .118 and 119.168) - Lawyers advise their clients of their rights and obligations and, when necessary, represent them in courts of law. In addition, lawyers negotiate settlements out of court and represent clients before quasi-judicial and administrative agencies of the government. They may act as trustees, guardians, or executors. Government attorneys play a large part in developing and administering Federal and State laws and programs; they prepare drafts of proposed legislation, establish law enforcement procedures, and argue cases.

Many people who have legal training are not employed as lawyers but are in other occupations where they can use their knowledge of law. They may, for example, be insurance adjusters, tax collectors, probation officers, credit investigators, or claims examiners. A legal background also is a valuable asset to people seeking or holding public office.

K. PARKS AND RECREATION - Modern technological advances have provided us with leisure time, and how we spend our non-working hours is highly significant. As a public service, many communities provide some form of parks and recreational facilities for year-round activities.

Parks have taken on an additional dimension of meaning with our concern of the environment.

Among the facilities available in some communities are: playgrounds, recreation centers, clubhouses, picnic grounds, athletics, aquatics, golf, museums, aquariums, and zoological gardens. Needless to say, such facilities offer many job opportunities. For this detail, see HOSPITALITY AND RECREATION.

**PUBLIC
SERVICES**

ADMINISTRATION AND REGULATORY SERVICES

Direct and coordinate the varied activities in local, State, and Federal government agencies. Provide regulatory services for financial institutions, public records, licensing, customs and immigration, and facilities.

City Manager
Accountant
Advertising
Marketing
Personnel
Public Relations
Purchasing
Engineers
Regulatory
Regulatory

URBAN DEVELOPMENT

Research and solve urban problems to help our cities become more convenient, comfortable, and safe places in which to live and work.

EDUCATION

Provide professional, technical, managerial, and related personnel that has been associated with the changing character of our economy.

Teaching
Counseling
Supervision
Support Activities
Transportation
Extension Services

PROTECTIVE SERVICES

Supply protective services that may be one of the conservation occupations such as a Forest Ranger preserving wildlife or an FBI Special Agent investigating espionage and sabotage.

POST OFFICE

Apply modern marketing techniques toward improving the postal product line.

Management
Postmaster
Supervisor
Crafts

PUBLIC UTILITIES

Produce, develop markets, and distribute public utilities to the consumer.

PUBLIC HEALTH

Provide (1) vital statistics, (2) environmental sanitation, (3) communicable disease control, (4) laboratory services, (5) maternal and child health, (6) chronic disease control and promote adult health, (7) health education.

County Health
Sanitarian
Field Health
See: HEALTH

LABOR AFFAIRS

Supply the labor demands of business and industry; protect the interests of the worker; and maintain a healthy economy.

PUBLIC TRANSPORTATION

Provide jobs in such areas as rapid transit, railroads, buses and trucks, airports and terminals, traffic control, maintenance, inland waterways operation, port authorities, turnpike and tollbridges, registration and licensing, and inspection.

See: TRANSPORTATION

SOCIAL SERVICES, REHABILITATION, CORRECTION

Meet the need for organized social services, rehabilitation, and correction of a complex urban society.

PARKS AND RECREATION

Provide some form of parks and recreational facilities for year-round community activities.

See: HOUSING

ATORY SERVICES

cal, State, and Federal government
institutions, public records, licensing,

City Managers
Accountants
Advertising Workers
Marketing Research Workers
Personnel Workers
Public Relations Workers
Purchasing Agent
Engineers
Regulatory Services-Financial
Regulatory Services-Other

Urban Planners
Environmental Scientists
Life Science Occupations
Physical Scientists
Social Sciences
Engineering and Science Technicians
Draftsmen
Food Processing Technicians
Technical Writers
Photographers
Architects
Landscaping Architects
Systems Analysts
Programmers
Surveyors
Electronic Computer Operating Personnel
File Clerks
Office Machine Operators

MENT

er cities become more convenient,
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Teaching
Counseling
Supervision
Support Activities
Transportation
Extension Service

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VICES

conservation occupations such as a
Agent investigating espionage and

Law Enforcement
Inspectors and Investigators
Special Services
Military
Civil Defense

improving the postal product line.

Management
Postmaster
Supervisor
Crafts

ES

ublic utilities to the consumer.

Water Systems
Sanitary Service
Electric Service
Gas Service
Customer Service Occupations

itation, (3) communicable disease
and health, (6) chronic disease control

County Health Officer
Sanitarian
Field Health Officer

See: HEALTH

S
protect the interests of the worker;

Employment Services
Employment Compensation
Labor Standards

ATION

ads, buses and trucks, airports and
terways operation, port authorities,
and inspection.

See: TRANSPORTATION

ION, CORRECTION

ation, and correction of a complex

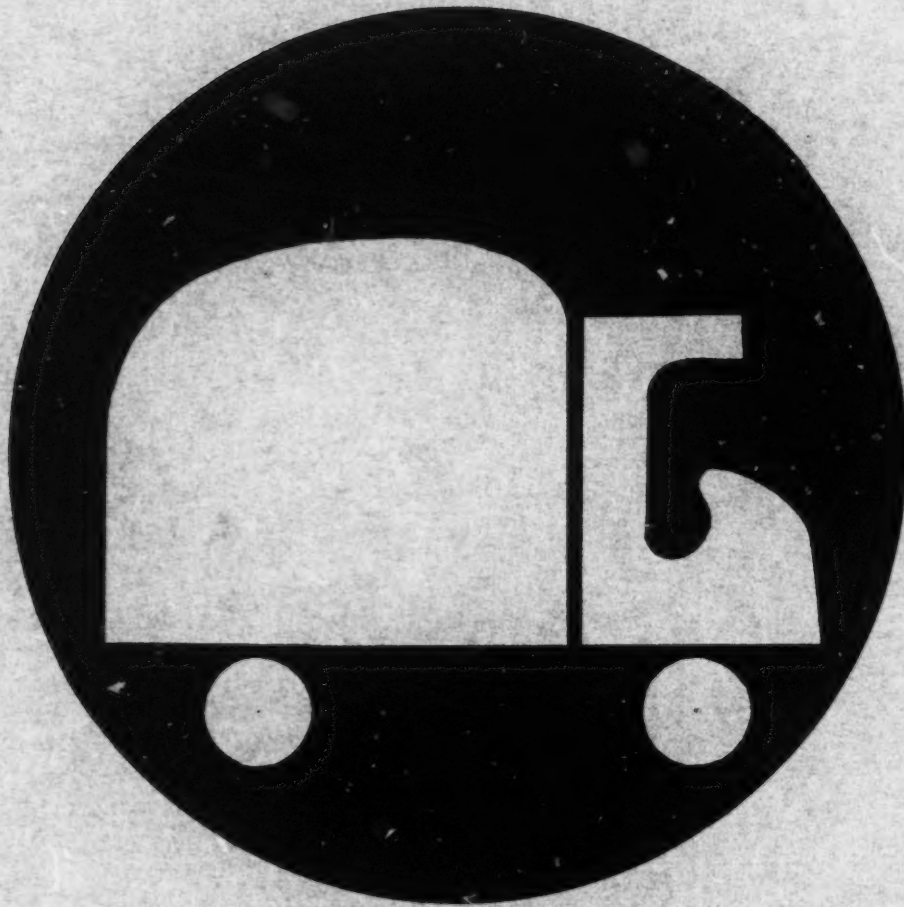
Social Workers
Social Service Aides
Institutional Child Care Technician
Rehabilitation Counselors
Lawyers

ATION

ilities for year-round community

See: HOSPITALITY AND RECREATION

TRANSPORTATION



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TRANSPORTATION

I. INTRODUCTION

TRANSPORTATION may be defined as the conveyance of human beings, and objects which are a part of the domestic economy, from one place to another. While one might think of this passage of people and goods as applicable only to wheeled vehicles on land, vessels on both inland and ocean waters, and in aircraft, it should be noted here that pipelines are also involved in TRANSPORTATION.

In any society, TRANSPORTATION is necessary for survival--even if the materials move on the backs of men and animals. But in an industrial society and effective system is vitally necessary. The transportation is the arterial system over which the blood of industry flows. Raw materials, fuel, and workers must be transported to factories; the finished goods must be moved to distributors and consumers. In addition, millions of people use the network in traveling for business and pleasure.

The need for an effective system of TRANSPORTATION will continue to grow as the nation's economy expands. While modes will change over the years with the increased usage of air cushion vehicles and aerospace devices, the field will continue to offer varied and challenging career possibilities.

The occupational opportunities included in this pamphlet have been divided into five job families:

- A. HIGHWAY TRANSPORT
- B. RAIL TRANSPORT
- C. AIRBORNE TRANSPORT
- D. PIPELINE TRANSPORT
- E. WATER TRANSPORT

II. METHODOLOGY

In determining the content of the booklet and chart, several approaches were utilized. The coordination between this cluster and other clusters was achieved by a series of conferences, both individual and group, with the other consultants involved in this

project. The bibliographical sources given below were consulted. Appropriate business experts were consulted when required. A computerized print-out of all the job titles in TRANSPORTATION, complete with Dictionary of Occupational Titles code numbers, was forwarded by the Texas Education Agency. Although the authorship is unknown, it was most helpful.

For further information external to this booklet, numerous sources are available. Some of the more valuable are these:

U.S. Department of Labor. Dictionary of Occupational Titles, Vols. I and II. Government Printing Office (Washington, D. C., 1965).

U.S. Department of Labor. Occupational Outlook Handbook. Government Printing Office (Washington, D. C., 1970-71).

U.S. Department of Health, Education, and Welfare and U.S. Department of Labor. Vocational Education and Occupations. Government Printing Office (Washington, D. C., 1969).

III. JOB FAMILIES AND OCCUPATIONAL LISTINGS

The individual Job Families, with a listing and discussion of the functions of individual occupations are listed below:

A. HIGHWAY TRANSPORT - This job family is the most varied in TRANSPORTATION. Taxi service, bus service, and trucking are covered here. In a vehicle-oriented society, this is a field with a growing future.

1. Driver - (D.O.T. series 109, 292, 259, 853, 902, 903, 904, 905, 906, 909, 911, 913, and 919) - A general title for a variety of occupations involved primarily in the operation of motor vehicles. Commercial drivers tend to specialize in areas such as vans, heavy trucks, buses, etc.

2. Maintenance and Repair Personnel - Concerned with keeping vehicles or specific equipment in good working order. Require mechanical skills and training in the various areas. This group includes Auto Electrician - (D.O.T. 825.281) - Refrigerating Machine Operator - (D.O.T. 919.782); Auto Mechanic Chief - (D.O.T. 620.131); Auto Mechanic; Motor and Chassis Inspector; Tune-Up Man; Carburetor Man; Front End Man; Auto Brakeman; and Transmission Mechanic -

(D. O. T. 620.281); Auto Radiator Man - (D. O. T. 620.381); Diesel Mechanic - (D. O. T. 625.281); Tire Repairman - (D. O. T. 914.884); Body Repair Man, Bus; Auto Body Repairman - (D. O. T. 807.381); Painter, Automobile - (D. O. T. 845.781); Gas and Oil Man - (D. O. T. 915.587).

3. Clerks - (D. O. T. 216, 219, 222, 223, 237, 243, 913, and 919 series) - Perform a series of office functions in the highway transportation field. General clerical and office skills combined in some instances with minor administrative duties. Generally specialized in a specific job. Also see BUSINESS AND OFFICE.

4. Parking Lot Attendant - (D. O. T. 915.878) - Basically concerned with the short or long term parking of automobiles. The function of this occupation is similar to that of Manager, Storage Garage - (D. O. T. 187.168).

5. Automobile Service Station Attendant - (D. O. T. 915.867) - Concerned with the fueling and simple servicing of automobiles.

6. Driver, Taxi - (D. O. T. 913.463) - A semi-independent operator who may be free to cruise the streets, or he may be radio dispatched. A taxi company may have various support personnel depending on the size of the firm.

7. Floorman - (D. O. T. 219.368) - Works in taxi company office and assigns cabs to individual drivers.

8. Starter - (D. O. T. 913.168) - Is basically a dispatcher who sends cabs to a customer. May answer telephone requests and contact drivers by radio.

9. Schedule Maker, Taxi - (D. O. T. 913.168) - May also be a starter, but if not, draws up duty times for the drivers.

10. Meter Reader - (D. O. T. 249.388) - Concerned with monitoring the taxi mileage and trip charges. Usually works in the larger taxi companies.

11. Taxi Serviceman - (D. O. T. 915.887) - Concerned with the upkeep of the taxies; may require various aptitudes as listed under Maintenance and Repair Personnel.

12. Supervisor, Cab - (D. O. T. 913.138) - May be concerned

with general office management. Also concerned with day to day operation of taxi service. Also see BUSINESS AND OFFICE.

13. Instructor, Taxi - (D. O. T. 919.228) - Deals with safety instruction and driving practices for the drivers.
14. Driver, Bus - See Driver description No. 1.
15. Dispatcher - (D. O. T. 913.168; 919.168) - One who routes and schedules buses on both urban routes and long distance routes. Must have a knowledge of office routine and the capability of the buses. Would generally work in the home office or terminal area.
16. Supervisory Personnel - Various supervisory personnel who manage the terminal or various functions in the terminal. Involves managerial and office skills in varying degrees. These occupations are Superintendent, Stations; Superintendent, Division; Supervisor, Terminal; Terminal Services Agent; Manager, Terminal; Manager, Traffic; Manager, Bus Transportation; Traffic Inspector - (D. O. T. 184.168); Depot Master - (D. O. T. 919.138); Manager, Operations; District Sales Representative; Manager, Regional; Director of Transportation - (D. O. T. 184.118); Road Supervisor - (D. O. T. 913.138); and Bus Inspector - (D. O. T. 620.281). Also see BUSINESS AND OFFICE.
17. Spotter - (D. O. T. 909.588) - Concerned that all safety regulations are carried out. Travels routes observing vehicular operation and reports violations.
18. Ticket Agent - (D. O. T. 919.368) - Handles the sale of tickets and the planning of simple travel routes for customers.
19. Baggage Man - (D. O. T. 358.878) or Porter Baggage - (D. O. T. 357.878) - Both are concerned with the movement and sorting of baggage in the terminal area.
20. Superintendent, Maintenance - (D. O. T. 187.168) or Superintendent, Maintenance of Equipment - (D. O. T. 184.168) - Both are concerned with maintenance and repair in a supervisory way, one with the terminal facilities and one with the vehicles.

21. Traffic Agent - (D. O. T. 255.258) - Actively solicits new business such as group tours or new routes.
22. Instructor, Bus - (D. O. T. 919.228) - Concerned with driving instruction with emphasis on safety for new employees.
23. Car Carder - (D. O. T. 913.887) - Changes advertising cards in urban buses.
24. Bus Hostess - (D. O. T. 352.878) - Performs general service duties for bus passengers while enroute.
25. Crating and Moving Estimator - (D. O. T. 258.458) - Deals with the cost estimation of merchandise and household goods for a trucking firm. Must be familiar with crating methods, and transportation systems.
26. Dispatcher, Motor Vehicle - (D. O. T. 919.168) - Involves some clerical duties, but is mainly concerned with the sending of trucks to various job locations.
27. Safety Engineer - (D. O. T. 909.128) - Concerned with drivers and safety procedures connected with equipment.
28. Sales Representative - (D. O. T. 240.358) - Deals with the sale of warehouse space for trucking firms. Some general selling may also be involved.
29. Supervisor, Leased Equipment - (D. O. T. 184.268) - Area of responsibility is the supervision and usage of leased trucks and warehouse equipment.
30. Driver Supervisor - (D. O. T. 901.138) - Concerned with the general supervision, conduct, and training of the drivers.
31. Warehouse Foreman - (D. O. T. 909.137) - In charge of the daily operation of the warehouse and the supervision of the employees. Some clerical skills may be required.
32. Truck Foreman - (D. O. T. 909.137) - Responsible for the trucks in the loading area and must make sure that the trucks are ready to answer schedules.
33. Checker - (D. O. T. 919.687) - Counts and verifies livestock shipped on trucks.

34. Tracer - (D.O.T. 222.368) - Tracks down lost parcels and crates shipped by motor freight.

B. RAIL TRANSPORT - This family is concerned with the transport of freight and passengers as well as maintenance and repair of rolling stock, track, bridges and right-of-way. Duties involving train operation, passengers services, and supervision are included.

1. Locomotive Engineer - (D.O.T. 910.383) - In charge of the actual operation of a locomotive. Operates the machinery, interprets signals, and is responsible for the safe, efficient operation of the train.
2. Fireman, Locomotive - (D.O.T. 910.383) - Presently acts more as an assistant to the engineer; has few distinctive duties.
3. Conductor, Road Freight - (D.O.T. 198.168) - A member of the train crew. Ordinarily rides in the caboose, handling communications and paperwork.
4. Passenger Service Personnel - Concerned with passenger trains and the activities connected with passenger service. Specific occupations include Steward, Dining Car - (D.O.T. 310.138); Automat Car Attendant - (D.O.T. 319.864); Dining Service Inspector - (D.O.T. 168.268); Chef, Cook - (D.O.T. 315.131); Cook, Railroad - (D.O.T. 315.381); Cook, Steam Table; Waiter, Dining Car - (D.O.T. 311.878); Reservation Clerk - (D.O.T. 910.368); Car Supplier - (D.O.T. 223.687); Conductor - (D.O.T. 910.868); Porter, Pullman - (D.O.T. 351.878); Hostess, Train - (D.O.T. 352.878); Conductor, Passenger Car, Pullman - (D.O.T. 198.168); Lounge Car Attendant - (D.O.T. 291.858); Caller - (D.O.T. 913.868); Call Boy; Gateman, Railway - (D.O.T. 910.868); Information Clerk - (D.O.T. 237.368); Passenger Representative - (D.O.T. 910.168); Ticket Agent - (D.O.T. 919.368); Porter Baggage - (D.O.T. 357.878); Baggage man - (D.O.T. 910.887).
5. Clerks - Assigned a variety of office functions dealing basically with office routine. May have some minor administrative requirements. Typical assignments include Over-short and Damage Clerk - (D.O.T. 919.388); Train Clerk - (D.O.T. 910.688); Freight Receiving Clerk - (D.O.T. 222.387); Demurrage Clerk - (D.O.T. 219.388); Railway Express

Clerk - (D. O. T. 910.368); Car Clerk, Pullman - (D. O. T. 910.168); Roadmaster Clerk; Road Clerk - (D. O. T. 229.388); Reconsignment Clerk - (D. O. T. 222.368); Dispatch Clerk - (D. O. T. 219.388). For information on general clerical duties, see BUSINESS AND OFFICE.

6. Railway Express Agent - (D. O. T. 910.138) - Concerned with handling orders for freight delivery from customers. Involves office procedures and knowledge of Railway Express procedures.

7. Foreman, Branch Office, Railway Express - (D. O. T. 910.137) - In charge of area warehouse where freight is gathered before shipment by the Railway Express Agency.

8. Yard Personnel - Concerned with operation of the train in the yard area exclusively. Yard Engineer - (D. O. T. 910.833), Fireman Yard - (D. O. T. 910.868), Conductor, Yard - (D. O. T. 910.138).

9. Hostler - (D. O. T. 910.883) - Charged with the responsibility of taking the engine from the repair or storage area and transferring it to the train crew.

10. Switch Tender - (D. O. T. 910.887) - Concerned with the operation of switches in a rail system employing manually-operated switches.

11. Turntable Operator - (D. O. T. 910.883) - Also known as a Transfer Table Operator. Operates the device used for moving locomotives from one place to another when being stored or repaired.

12. Car Retarder Operator - (D. O. T. 910.883) - Operates a device that slows down cars that have been pushed, singly, down a line of track.

13. Motorman - (D. O. T. 910.883; 919.883; and 913.363) - Concerned with the operation of an urban train system such as a subway train.

14. Signal Foreman - (D. O. T. 822.131) - Directs the placement and repair of railroad signal equipment.

15. Towerman - (D. O. T. 910.782) - Concerned with the remote control of switches and signals for a rail system in

a yard area.

16. Brakeman - (D. O. T. 910.884) - Charged with the duties of coupling, uncoupling, and safety inspection of a train while it is being assembled in the yard area.

17. Yardmaster - (D. O. T. 184.168) - Responsible for operation of the train yard. Supervises other employees working in the yard.

18. Right-of-Way Personnel - Concerned with the care, maintenance and inspection of the track and roadbed. General occupational areas include Tamping Machine Operator - (D. O. T. 859.883); Rail Flaw Detector Operator - (D. O. T. 910.281); Track Broom Operator - (D. O. T. 910.883); Ballast Cleaning Machine Operator - (D. O. T. 859.883); Carpenter, Bridge - (D. O. T. 860.381); Track Repairman - (D. O. T. 910.782); Way Inspector - (D. O. T. 910.287); Bridge Inspector - (D. O. T. 869.287); Track Oiler - (D. O. T. 910.887); Track Walker - (D. O. T. 910.688); Supervisor of Way - (D. O. T. 184.168); Supervisor of Bridges and Buildings; Roadmaster - (D. O. T. 182.168); Grinding Machine Operator, Portable - (D. O. T. 910.884); Salvage Inspector - (D. O. T. 622.381). Also see CONSTRUCTION.

19. Freight Operations Personnel - Concerned with the handling of freight from the initial arrangements to the servicing of various specialized railcars. General occupational areas include Crating and Moving Estimator - (D. O. T. 259.458); Freight Loading Foreman - (D. O. T. 910.137); Perishable Freight Inspector - (D. O. T. 168.688); Car Sealer - (D. O. T. 910.587); Loading Inspector - (D. O. T. 168.688); Car Checker - (D. O. T. 229.388); Car Icer - (D. O. T. 910.837, and 910.885).

20. Electrical Train Personnel - Operate trains powered by electricity, either overhead or third rail type. Specific occupations include Third Railman - (D. O. T. 825.781); Electrician, Locomotive; Electrical Track Switch Maintainer - (D. O. T. 825.281); Supervisor, Line Department - (D. O. T. 825.138); Emergency Man - (D. O. T. 910.281); Foreman, Electrical - (D. O. T. 825.131); Superintendent, Power (D. O. T. 184.168).

21. Round House Foreman - (D. O. T. 622.131) Charged with the supervision of the round house and maintenance personnel.

22. Laborer, Car Barn - (D. O. T. 910.883) - Performs various tasks in the storage and maintenance area for streetcars or buses.

23. Maintenance and Repair Personnel - Charged with the cleaning, repair, and maintenance of railcars and street cars. Specific occupations include Railroad Car Inspector - (D. O. T. 910.287); Superintendent, Maintenance of Equipment - (D. O. T. 184.168); Car Cleaning Foreman - (D. O. T. 910.138); Freight Car Cleaner - (D. O. T. 910.887); Street Car Repairman - (D. O. T. 806.381); Car Man - (D. O. T. 622.381); Foreman, Car Installations - (D. O. T. 806.131); Car Man Foreman - (D. O. T. 622.131); Car Inspector - (D. O. T. 910.684); Air Valve Repairman; Railroad Wheels and Axle Inspector - (D. O. T. 622.381); Greaser, Journal Box - (D. O. T. 910.885); Foreman, Wheel Shop - (D. O. T. 622.131); Diesel Mechanic - (D. O. T. 625.281); Locomotive Inspector - (D. O. T. 622.281).

24. Tracer - (D. O. T. 222.368) - Deals with the finding of misplaced or lost freight or cargo.

25. Baggage and Mail Agent - (D. O. T. 910.138) - Concerned with the acceptance and forwarding of baggage and mail, and may be required to work independently in a remote area.

26. Mail Sorter - (D. O. T. 222.687) - Sorts mail and parcels in a major train station.

27. Car Distributor - (D. O. T. 910.368) - Concerned with the sending and placing of cars to the place where needed or where an anticipated need is foreseen.

28. Traffic Agent - (D. O. T. 255.258) - Performs analysis on present and future traffic patterns in order for new routes or services to be developed.

29. Road Foreman of Engines - (D. O. T. 910.137) - In charge of specific information to locomotive crews, such as size of special loads, speed, route, and special stops.

30. Express Messenger - (D. O. T. 231.687) - Rides in the mail car and sorts parcels and valuables.

31. Lampman - (D. O. T. 910.887) - Concerned with the installation and repair of external lights on a train.

32. Special Agent - (D. O. T. 372.368) - Concentrates on the security of shipments of valuables while enroute.
33. Patrolman - (D. O. T. 376.868) - Concerned with the general security of railroad property in the terminal and yard area.
34. Engine Dispatcher - (D. O. T. 910.368) - Directs locomotives to various locations in a yard so that trains may be complete.
35. Train Dispatcher - (D. O. T. 184.168) - Controls the departure and scheduling of trains.
36. Director, Train - (D. O. T. 910.168) - Concerned with the direction of inbound and outbound trains in the yard area.
37. Supervisory Personnel - Concerned with the administration, inspection, and policy-making aspects of rail transport. Occupations include Employee Operations Examiner - (D. O. T. 166.268); General Agent, Operations; Superintendent, Divisions; Superintendent, Stations; Station Master - (D. O. T. 184.168); Station Agent - (D. O. T. 910.138 and 211.468); Depot Master - (D. O. T. 919.138); Manager, Industrial Development; Manager, Operations; and Import-Export Agent - (D. O. T. 184.118). See BUSINESS AND OFFICE for general managerial duties.

C. AIRBORNE TRANSPORT - Airborne transportation continues to grow in importance to our society. Because of this, new aerial services and occupations are constantly being added. Three growth areas for the future are space travel, helicopter/VTOL (vertical take off and landing) craft, and air-cushion vehicles for passenger and freight service. While it is difficult to foresee which direction space travel will take in the commercial sense, it is not so vague in the case of other newer systems of transportation. As urban areas expand, and as urban airports are forced out of congested areas, helicopter/VTOL may be the answer for rapid movement of passengers to and from the terminal area. Air-cushion vehicles also offer a possible solution for near-surface transportation in an era when too many acres of fertile, productive land are being paved for wheeled vehicular traffic. In any case, with the increasing demand for fast transportation, the Airborne Transport family is a rapidly growing job cluster. It might be noted, however, that most of the occupations that will develop in any new mode of aerial transportation will closely parallel those already in existence, many

of which are listed in this pamphlet.

1. Pilot - (D. O. T. 196.168; 196.268; 196.283) - Concerned with the ultimate responsibility for the operation and safety of the aircraft, and passengers if carried. Must be familiar with navigation and engineering capability of the airplane. Responsible for meeting timetable.
2. Navigator - (D. O. T. 193.188) - In charge of the navigation of the aircraft. Navigates through the use of electronic, optical, and natural aids. Maintains maps and charts to aid pilot in accurate trip planning.
3. Flight Engineer - (D. O. T. 621.281) - Member of the flight crew in charge of in-flight maintenance and operation of power-plants and auxillary machinery. Maintains fuel flow, engine temperatures, and engine speed within acceptable limits.
4. Airplane Stewardess - (D. O. T. 352.878) - Concerned with performing personal passenger services, such as child care, food and beverage service, and stowing hand luggage.
5. Air Traffic Control Personnel - In charge of directing aircraft traffic in the area of an airport through the use of radar and radio. May work in a tower, a control center, or a regional center. Job titles are Air Traffic Coordinator; Air Traffic Control Specialist, Station; Air Traffic Control Specialist, Tower - (D. O. T. 193.168).
6. Maintenance and Repair Personnel - Responsible for the supervision and performance of various repair and maintenance functions on aircraft and airport facilities. Job titles include Electrician, Airplane - (D. O. T. 312.825); Airport Electrician - (D. O. T. 824.781); Radio Mechanic, Aircraft - (D. O. T. 823.281); Mechanic, Aircraft Accessories - (D. O. T. 621.781); Aircraft Air Conditioning Trunk Operator - (D. O. T. 912.782); Carbretor Man; Supercharger Mechanic; Aircraft and Power Plant Mechanic; Hydraulic Tester - (D. O. T. 621.281); Painter, Aircraft - (D. O. T. 845.781); Dope and Fabric Man - (D. O. T. 849.781); Skin Man - (D. O. T. 807.381); Foreman, Aircraft Cleaning - (D. O. T. 891.137); Aircraft Log Clerk - (D. O. T. 219.388); Foreman, Aircraft Maintenance - (D. O. T. 621.131); Superintendent of Maintenance - (D. O. T. 187.168); Line Man - (D. O. T. 912.887); Airport Serviceman - (D. O. T. 912.384); Equipment Service Supervisor - (D. O. T. 912.137); Airplane Inspector - (D. O. T. 621.281); Airport Maintenance Chief -

(D. O. T. 899.137); Laborer, Airport Maintenance - (D. O. T. 912.887); Parachute Rigger - (D. O. T. 912.884).

7. Reservation Agent - (D. O. T. 912.368) - Concerned with making of reservations and scheduling of trips for passengers. May make reservations by telephone, telegraph, or in person.
8. Ticket Agent - (D. O. T. 919.368) - Duties similar to the Reservation Agent but normally works in the terminal and deals personally with the public.
9. Airline Radio Officer - (D. O. T. 193.282) - Charged with the communications network that ties together airplanes, weather stations, and airports. He is ground based.
10. Instructor, Personnel - Concerned with the instruction of the flight crew in various safety and operational procedures. Job titles are Instructor, Flying; Instructor, Pilot - (D. O. T. 196.228); Ground Instructor, Basic/Advanced/Instrument - (D. O. T. 097.228).
11. Scheduling Personnel - Charged with the responsibility for route and crew scheduling. Job titles include Flight Crew Time Clerk; Crew Scheduler - (D. O. T. 219.388); Crew Scheduler Chief - (D. O. T. 219.138); Schedule Analyst - (D. O. T. 912.168); Trip Follower - (D. O. T. 912.388).
12. Dispatcher Personnel - Authorize, regulate, and control commercial flights so that the flights conform to company policy and government safety regulations. Job titles are Dispatcher; Airplane Dispatch Clerk - (D. O. T. 912.368).
13. Weather Clerk - (D. O. T. 239.368) - Concerned with the promulgation of weather information to flight crews at the appropriate time.
14. Porter, Baggage - (D. O. T. 357.878) - Handles baggage for airline customers at the airport.
15. Load Control Agent - (D. O. T. 259.388) - Computes the weight of cargo aboard aircraft, and cargo placement, so that safe weight limits are observed.
16. Cargo Agent - (D. O. T. 912.368) - Expedites the movement of cargo for customers by preparing the paperwork and making the appropriate arrangements.

17. Traffic Rate Clerk - (D. O. T. 912.488) - Computes the charges for freight and passenger services rendered by the airline.

18. Plotting Board Operator - (D. O. T. 239.588) - Concerned with the computation of the position of in-flight aircraft throughout a trip. Determines position by radio reports and plots location on a visual display screen or board.

19. Supervisory Personnel - Charged with administration and policy-making activities of airline service. Job titles are Radio Chief; Airline Radio Operator Chief - (D. O. T. 193.168); Manager Operations; Superintendent, Airport - (D. O. T. 184.112); Superintendent, Division; Superintendent, Station Manager, Station; Manager, Traffic - (D. O. T. 184.168). See BUSINESS AND OFFICE for managerial functions.

20. PIPELINE TRANSPORT - Pipeline transportation is the smallest and most specialized of the TRANSPORTATION families. Careers in this family are in supervision and repair or operation of the pipeline transport of solids or liquids.

1. Coal Pipeline Operator - (D. O. T. 914.782) - In charge of the mixing of coal with water so that the solution may be transported by pipeline.

2. Coating Inspector Pipeline - (D. O. T. 862.287) - Observes the wrapping of the outside of a pipeline so that it will meet contract specifications.

3. Gasman Head - (D. O. T. 549.131) - Supervises the activities of workers engaged in the transport and testing of natural gas.

4. Foreman, Dock - (D. O. T. 922.138) - Concerned with supervision of the loading and unloading of petroleum products at the terminal.

5. Gager - (D. O. T. 914.381) - Tests the amount of oil in storage tanks and controls the flow of oil from the well into the pipeline.

6. Line Walker - (D. O. T. 914.584) - Patrols the pipeline on foot or horseback or in a vehicle to detect leaks.

7. Loading Rack Foreman - (D. O. T. 927.138) - Concerned with the loading and unloading of petroleum trucks and rail tank cars.

8. Pumpman - (D. O. T. 914.885) - In charge of various types of pumps. Performs several tasks including general pumping operations, transferring products to and from tank trucks and rail tank cars, pumping oil from wells, and various maintenance activities.

9. Station Engineer, Main Line - (D. O. T. 914.782) - Concerned with the operation of a major pumping terminal and the control of product flow.

10. Dispatchine Personnel - Concerned with the scheduling and timing of pipeline usage. Occupational titles are Dispatcher Chief - (D. O. T. 184.168); Dispatcher, Relay - (D. O. T. 914.368); and Dispatcher, Oil - (D. O. T. 914.168).

11. Supervisory Personnel - Charged with the supervision, control, and administration of the pipeline system and certain of its major component parts. Occupational titles are Station Engineer Chief; Compressor Station Engineer Chief - (D. O. T. 914.132); Superintendent, Measurement; Superintendent, Pipelines; and Superintendent, Compressor Station - (D. O. T. 184.168).

12. Supervisors of Pipeline Maintenance - Concerned with handling of crews who inspect and repair damage to pipelines. Job titles include Foreman, Pipeline Maintenance; and Maintenance Inspector Foreman - (D. O. T. 914.138).

13. Foreman, Pipelines - (D. O. T. 862.131) - Coordinates and directs the crew engaged in laying pipelines.

14. Foreman, Field Pipelines - (D. O. T. 914.131) - In charge of the pipeline system that gathers the oil from various wells and concentrates it at a central terminal point.

E. WATER TRANSPORT - Water is one of the most important modes of transport but is probably the least understood. Water transport, when usable and feasible, is the most economical of all types of transportation. As the use of canals and new types of watercraft expand, the demand for people will expand in this job family.

1. Master, Ship (Ship Captain) - (D. O. T. 197.168) - In charge of the operation, administration, and navigation of a ship. The duties of the Master involve compliance with safety regulations, company regulations, schedule commitments, and the ultimate

responsibility for the ship and its passengers and crew.

2. Mate, Ship - (D. O. T. 197.133) - Known as deck officer. This officer is responsible for the operation of the navigating bridge area and the cargo booms. Other job titles are Tugboat Mate - (D. O. T. 197.133); and Cadet, Deck - (D. O. T. 911.133).
3. Engineer - (D. O. T. 197.130) - Ship's officer responsible for operation of the powerplant and various pieces of machinery aboard ship. Similar job titles are Deck Engineer; Junior Engineer - (D. O. T. 623.281); Cadet Engineer - (D. O. T. 197.130).
4. Radio Officer - (D. O. T. 193.282) - Charged with the operation of the communications equipment on the ship, both ship-to-ship, and ship-to-shore.
5. Passenger Service Personnel - Responsible for various duties related to passenger service in the area of comfort and convenience. Job titles are Purser - (D. O. T. 197.168); Port Purser - (D. O. T. 166.168); Steward/Stewardess - (D. O. T. 350.368; 350.138; 350.878); Scullion - (D. O. T. 318.887).
6. Pilot, Ship - (D. O. T. 197.133) - Concerned with the steering of ships in and out of a port. Generally a pilot is an expert on one port and spends his entire career guiding ships in and out of one specific port or inland navigable waterway.
7. Ship's Crew - Divided into deck and engineering departments. Duties are confined to a speciality within a department. Work is performed under the supervision of ship's officers. Job titles are Marine Oiler - (D. O. T. 911.884); Quartermaster - (D. O. T. 911.883); Ordinary Seaman; Deckhand - (D. O. T. 910.887); Able Seaman - (D. O. T. 911.884); Boatswain - (D. C. T. 911.131).
8. Maintenance and Repair - Some of these jobs are related to MANUFACTURING and CONSTRUCTION since the occupations are involved in both the repair and construction of ships. Job titles included are Hull Inspector - (D. O. T. 806.281); Rigger Foreman - (D. O. T. 806.131); Machinist, Outside - (D. O. T. 623.281); Machinist Foreman, Outside - (D. O. T. 623.131); Pipefitter Foreman - (D. O. T. 862.131); Pipefitter - (D. O. T. 862.281); Diesel Mechanic - (D. O. T. 625.281); Machinist, Marine Engine - (D. O. T. 632.281); Electrician -

(D. O. T. 825.381); Electrician, Foreman - (D. O. T. 825.131); Rigger - (D. O. T. 806.281); Painter Foreman, Shipyard - (D. O. T. 840.131); Joiner - (D. O. T. 860.381); Shipfitter - (D. O. T. 806.381); Shipfitter Foreman - (D. O. T. 806.131).

9. Freight Handling Personnel - This category includes coal handlers, stevedores, and various occupations involved in the loading of ships. Such personnel work entirely in the port area, usually on a dock or pier, but some function aboard the ship while loading cargo. Jobs include Location Man - (D. O. T. 222.588); Superintendent, Stevedoring; Header - (D. O. T. 911.138); Container Coordinator - (D. O. T. 222.388); Linesman; Coal Trimmer; Coal Handler - (D. O. T. 910.887); Coal Tower Operator - (D. O. T. 921.883); Beltman; Boat Loader Helper; Longshore Stevedore - (D. O. T. 922.887); Longshoreman - (D. O. T. 911.883); Hatch Tender - (D. O. T. 910.868); Boat Loader - (D. O. T. 911.884).

10. Lock Personnel - Concerned with the operation and maintenance of locks used in inland waterways to raise and lower vessels for transit through canals of varying elevation. Jobs are Lock Tender - (D. O. T. 911.782); Lock Tender Chief Operator - (D. O. T. 911.131).

11. Baggage Master - (D. O. T. 911.368) - Directs the handling, storing, and sorting of passenger baggage aboard ship.

12. Checker - (D. O. T. 223.387) - Compiles records of amount, kind, and condition of cargo loaded on or unloaded from a ship. Records damage to cargo.

13. Dispatcher, Tugboat - (D. O. T. 911.368) - Concerned with the sending of tugs on call to the locations where they are needed.

14. Gearman - (D. O. T. 623.381) - Responsible for the repair and, when necessary, fabrication of cargo handling equipment.

15. Storekeeper - (D. O. T. 223.387) - Responsible for the issuing and tabulation of consumable supplies of various types. May be aboard ship as part of a crew.

16. Supercargo - (D. O. T. 911.168) - Type of freight clerk. Responsible for coordinating loading and unloading of the cargo.

17. Warf Personnel - Concerned with the assessing of proper charges to ships for the use of pier areas and facilities. Also enforce docking and safety regulations. Jobs are Wharfinger Chief - (D. O. T. 184.168); and Wharfinger - (D. O. T. 184.388).

18. Wharfman - (D. O. T. 921.887) - Handles the spout used in loading grain aboard ships.

19. Instructor, Navigation - (D. O. T. 099.228) - Instructs appropriate personnel in navigation.

20. Clerks and Office Personnel - Concerned with various office duties with limited administrative responsibilities included. Jobs include Services Clerk - (D. O. T. 219.388); Clerk and Dispatcher, Pilot Station - (D. O. T. 911.368); Booking Clerk - (D. O. T. 222.368); Receipt and Report Clerk - (D. O. T. 911.388); Tonnage and Compilation Clerk - (D. O. T. 911.488); Incoming Freight Clerk; Paper Control Clerk - (D. O. T. 219.388). Also see BUSINESS AND OFFICE for clerical duties.

21. Ticket Agent - (D. O. T. 919.368) - Sells tickets to prospective customers and may help plan trip.

22. Supervisory Personnel - Concerned with the administration and policy formulation segment of water transportation. Job titles are Documentation Supervisor - (D. O. T. 911.138); Superintendent, Marine - (D. O. T. 184.168); Manager, Harbor Department - (D. O. T. 184.118); Port Traffic Manager; Manager, Traffic; Superintendent, Terminal; Float Master - (D. O. T. 184.168), Traffic Agent - (D. O. T. 255.258); Manager, Operations - (D. O. T. 184.118); Water Way Traffic Checker - (D. O. T. 911.388). Also see BUSINESS AND OFFICE for general managerial duties.

TRANSPORTATION

HIGHWAY TRANSPORTATION

This job family includes occupations associated with bus, truck, and taxi transportation.

Driving
Repair
Bagga
Cleric
Dispa
Sales
Parkin
Servic
Drivin
Super
Ticke
Bus H
Traffi
Taxi S

RAIL TRANSPORTATION

Occupations related to the operation of railroads, streetcars, and subways are grouped together in this job family.

AIRBORNE TRANSPORTATION

This job family contains a listing and discussion of the occupations associated with airline passenger and freight service, as well as those involved in terminal operation and management.

Fligh
Super
Safet
Sched
Ticke
Air T
Instru
Cleric
Bagga
Cargo
Parac

PIPELINE TRANSPORTATION

Those occupations connected with pipeline transportation of both solids and fluids are grouped together in this job family.

WATER TRANSPORTATION

Grouped together in this job family are those occupations involved in both ocean and inland waters transportation.

Ship,
Off
Piloti
Harbo
Wharf
Conta
Safety
Bagga
Ticke
Cleric
Bus H
Instru
Ferry
Canal

ATION
bus, truck, and taxi transportation.

Driving
Repair and Maintenance
Baggage Handling
Clerical Operations
Dispatching
Sales Representation
Parking Lot Operation
Service Station Operation
Driving Instruction
Supervision
Ticket Sales
Bus Hospitality
Traffic Management
Taxi Service

ON
streetcars, and subways are grouped

Train Crew
Freight Handling
Passenger Service
Supervision
Clerical and Office
Repair, Maintenance, and Salvage
Right of Way Personnel
Yard Workers
Safety Inspection
Street Car Operation and Service
Ticket Sales

ATION
the occupations associated with
e involved in terminal operation

Flight Crew
Supervision
Safety Inspection
Scheduling and Dispatching
Ticket Sales
Air Traffic Control
Instruction
Clerical and Office
Baggage Handling
Cargo Personnel
Parachute Rigging

TION
ation of both solids and fluids are

Station Engineering
Supervision
Loading Rack Operation
Dispatching
Compressor Station Operation
Pumping
Line Walkers
Safety Inspection
Maintenance and Repair
Clerical and Office

ION
tions involved in both ocean and

Ship, Tug, Barge, or Dredge
Officers and Crew
Piloting
Harbor Control
Wharf and Stevedoring Personnel
Container Handling
Safety Personnel
Baggage Handling
Ticket Sales
Clerical and Office
Bus Hospitality
Instruction
Ferryboat Operation
Canal Lock Operation